THE STORY OF ARCHITECTURE

P. Leslie Waterhouse

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1. DURHAM CATHEDRAL FROM THE RIVER WEAR

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THE STORY OF ARCHITECTURE

By

P. LESLIE WATERHOUSE

Revised by

R. A. CORDINGLEY

M.A., F.R.I.B.A.

B. T. BATSFORD LTD

LONDON NEW YORK
TORONTO SYDNEY

First published, 1902
Revised Edition, published, 1924
Third Edition, revised, 1950

MADE AND PRINTED IN GREAT BRITAIN BY
THE TONBRIDGE PRINTERS LTD. TONBRIDGE
FOR THE PUBLISHERS, B. T. BATSFORD LTD.
LONDON: 15 NORTH AUDLEY STREET, W.1
AND MALVERN WELLS, WORCESTERSHIRE
NEW YORK: 122 EAST 55TH STREET
TORONTO: 103 ST CLAIR AVENUE WEST
SYDNEY: 156 CASTLEREAGH STREET

PREFACE

THE earlier editions of this book having found favour with a wide circle of readers, in the present revision it has been the endeavour to maintain as nearly as possible the form and character which Mr. Leslie Waterhouse had given to it. The changes made mostly arise from the development of historical and archæological knowledge in the interim; which has occasioned certain corrections of fact and various consequential adjustments in the inferences previously drawn from them—some trivial and others important.

A moderate proportion of the text consequently has been re-cast, apart from the Aegean, Etruscan and the earlier part of the Roman historical sections which have been quite substantially rewritten in order to meet current understanding of the architectural contributions made in these phases. Further, since the organic simplicity of present-day architecture has stimulated a greater interest than formerly in the root structural arrangements of historical monuments and in the factors which operate to determine characteristic architectural forms, these matters now have been a little more deeply explored at each historical stage.

The latter part of the book has been greatly expanded, and extended to carry the story forward to the time of the opening of the second great war. A separate chapter has been devoted to the Renaissance in England, whilst the final two chapters, dealing respectively with nineteenth and twentieth century trends, are almost entirely new.

These extra demands on space have necessitated the omission of the former short chapter on Saracenic architecture, and of some references to medieval building in Germany, Belgium and Spain.

In a work of so broad and general scope as the present, it is impracticable to make specific references to the numerous sources used in its preparation, without weighting it disproportionately. They are none the less gratefully acknowledged. Some of the sources are named directly in the text or on the illustrations; the recommended books listed at the end of the volume almost without exception have afforded a greater or less amount of helpful information.

R. A. C.

Manchester 1950

CONTENTS

Chap.		*Page*
	Preface	v
	Acknowledgment	ix
	Introduction	xi
I	Egyptian and West Asiatic Architecture	
	Egyptian	1–16
	West Asiatic	16–20
II	Aegean and Greek Architecture	
	Aegean	21–29
	Greek	29–47
III	Etruscan and Roman Architecture	
	Etruscan	48–53
	Roman	53–74
IV	Early Christian and Byzantine Architecture	
	Early Christian	75–83
	Byzantine	83–89
V	Romanesque Architecture	
	Italy	90–97
	France	97–101
	England	101–105
VI	Gothic Architecture	106–110
	France	110–114
	Great Britain	114–124
	Italy	124–128

Chap.		*Page*
VII	Renaissance Architecture in Europe	
	Italy	129–146
	France	146–151
	Germany	151–155
VIII	Renaissance Architecture in England	156–176
IX	The Nineteenth Century	
	Britain	177–183
	Europe	183–184
	America	184–187
	The Rise of Industrial Architecture	188–195
	The Beginnings of Modern Architecture	195–199
X	The Twentieth Century	
	Modern Architecture	200–211
	Books Recommended	212–215
	Index to Text and Illustrations	216–228

ACKNOWLEDGMENT

THE Publishers wish to acknowledge their obligation to the following artists and photographers whose work appears in this book:

Messrs. Aerofilms Ltd., for Figs. 2, 73, 89, 90, 107 and 108; Fratelli Alinari, Florence, for Figs. 29, 35, 55, 56, 79, 85, 86, 88 and 92; Messrs. T. & R. Annan & Sons Ltd., for Fig. 126; *The Architectural Review*, for Fig. 133; Messrs. Autrey, Tynemouth, for Fig. 61; The British School at Rome, for Fig. 30; University Press, Cambridge, for Figs. 24, 26, 32 and 46; Samuel Chamberlain, for Fig. 123; A. C. Champagne, Paris, for Fig. 95; Professor R. A. Cordingley, for Figs. 34 and 52; *Country Life*, for Fig. 116; The English Universities Press, Ltd., for Fig. 16; Messrs. Exclusive News Agency Ltd., for Figs. 4, 77, 100, 110, 129 and 130; Cyril A. Farey, F.R.I.B.A., for Fig. 127; Messrs. Fox Photos Ltd., for Fig. 125; E. Chambré Hardman, for Fig. 78; Miss Margaret Holman, for Fig. 64; Hoyningen-Huene, for Fig. 21; P. de Jong, for Fig. 17; A. F. Kersting, F.R.P.S., for Figs. 3, 76 and 117; Messrs. Dorien Leigh, for Fig. 128; Messrs. Longmans Green & Co., Ltd., for Fig. 111; Messrs. Methuen & Co., Ltd., for Fig. 33; Donald McLeish, for Figs. 7, 36, 37, 57, 84 and 98; Messrs. Paul Popper, for Fig. 72; Mrs. M. Quennell, for Figs. 15, 22, 27, 31 and 39; Royal Institute of British Architects, for Fig. 18; Jean Roubier, for Fig. 59; R. A. Smith, for Fig. 131; J. H. Stone, for Fig. 113; Messrs. The Topical Press Agency Ltd., for Figs. 120 and 124; Messrs. Raphael Tuck & Sons Ltd., for Fig. 122; The United States Information Bureau, for Fig. 132; E. L. Wratton, for Fig. 118.

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INTRODUCTION

THERE is no subject that opens to us wide avenues of pleasure at such trifling cost of time as the study of architecture. And in this field it can be said with truth that a little learning is not a dangerous thing: it is a pleasant and a helpful thing. One may go further and say that for all who wish to get their full share of interest and enjoyment out of life it has become a necessary thing.

Our opportunities for intelligent travel are increasing daily. Fifty years ago the motor-car in England was restricted to a pace of four miles an hour; moreover, the law required that it should be preceded by a man waving a red flag. Conditions in this and in other respects have changed in the course of the present century, and our radius of easy travel has enlarged greatly. All thoughtful people are now desiring to acquire an elementary knowledge of the history of the buildings which they may visit in the course of their wanderings, and of the conditions under which these buildings have arisen. And it matters little whether these wanderings be through the towns and villages around their home, or among the greater churches and cathedrals of England, or, further afield, along the banks of the Loire, the Arno, or the Tiber. For it is at last being recognised that architecture is not a matter of styles and mouldings and students' terms: it has a human quality: it touches us at every point, and, of all the fine arts, is the one most intimately associated with the lives of all of us.

The reader is asked to bear in mind this close association between architecture and its creators, between architecture and the civilisation which produced it: to remember that through it, more readily than by any other means, we may grasp the spirit of the past. For architecture has always been an expression of human life, the medium by which nations have recorded—truly, because unconsciously—their emotions, their aspirations, their beliefs. Viewed in this light, old buildings acquire an added charm, as the civilisations which they mark pass in review before us—Egyptian, Greek or Roman: the genius of the Gothic constructors, expressed in those buildings which represent the "triumph of science and the incarnation of romance"; all the varied energies of the artists of the Renaissance . . . .

And so, down to the present time. For the glamour of the past

must not be allowed to blind us to the claims of the present. The architecture of to-day vitally concerns every householder and every citizen. We must learn—indeed, we are learning—to take an intelligent interest in all that is going on around us; to discriminate, to take pride in the glory of every new building in our midst which successfully claims to represent our nobler aspirations. And if, as has been well said, every nation has the architecture which it deserves, we shall feel that we are, each of us, doing our part and making our contribution towards the " loud sum of the Silent Units."

CHAPTER I

EGYPTIAN AND WEST ASIATIC ARCHITECTURE

THE earliest men of whom any traces exist were cave-dwellers; and it has been well said that the father of all architecture was he who first discovered that he could build a wall by the simple process of piling one stone upon another. This new idea was followed by the introduction of carpentry, the use of the pier and the lintel, and the many other improvements which went to make true architecture.

A complete story of architecture would therefore cover almost as great a period of time as the story of man himself. Unfortunately, the efforts of our earlier ancestors in this field have entirely disappeared. It was not until man, in the course of civilisation, became a mighty builder, and not that only, but a builder in materials of an imperishable nature, that he was able to leave behind him monuments to tell the story of his life to future ages. Thus it comes about that it is impossible to trace the growth of the art from its earliest beginnings, and to follow its development as it grew in importance. The oldest memorials of which we have records—the tombs and temples of ancient Egypt—were the work, not of a race of primitive men, but of a nation which had already attained a knowledge of the art of construction which later builders have never surpassed.

The waters of the Nile are the head-waters of architecture. On the banks of this stream—the cradle of the art—the colossal piles of these early builders still command the wonder of all who see them.

The dating of Egyptian monuments and works of art is still uncertain, especially in the earlier phases of development, and for this reason they are usually related to the different families or *dynasties* of Pharaohs who ruled the land, one dynasty being distinguished from another by breaks of continuity in the normal hereditary succession. In all, some thirty-one dynasties are recognised—if we include among them certain periods of temporary foreign domination, mostly in later times—extending perhaps, from 3300 to 332 B.C. Afterwards, there were two dynasties of Greek conquerors, who in their turn succumbed to the Romans, in 30 B.C. The civilisation already was quite well ad-

vanced in the first dynasty, but the Egyptians had not previously built their monuments in enduring form.

Earlier works of the Egyptian builders have been identified, but their greatest and most characteristic monuments, the pyramids of the fourth and neighbouring dynasties, have remained unchallenged for almost five thousand years as the greatest of all architectural undertakings. With these works of the mysterious inhabitants of the Nile valley begins the history of architecture, so far as our knowledge of it can at present go.

No other country bears such testimony as Egypt to the great *historical* value of architecture. Other nations of antiquity have, possibly, been equally powerful, or as highly civilised; but they have failed to leave behind them such enduring monuments to record their greatness—their literature in stone or granite—and they have almost disappeared from the pages of history. Not so the Egyptians. There is a " voicefulness " in these old tombs and temples along the banks of the Nile which gives reality and life to the history of the men who built them. Hence the unique interest which attaches to the architecture of Egypt. These temples, these walls, that have so long been " washed by the passing waves of humanity," present a reliable record of the social and religious life of their builders, whose life-story would otherwise have been totally lost in obscurity. Egypt claims the attention of students of architecture, too, by reason of having produced monuments which, for massiveness and grandeur, have never been excelled in the world's history. Yet Egyptian architecture must ever remain, to some extent, a subject by itself; it occupies no very important place in the story of art, or of the architecture which chiefly concerns us—that of Europe. But as an expression of human character it reflects accurately the intellectual limitations of its designers and constructors. It is a strange fact that, with the exception of the few features which were borrowed by the Greeks and their predecessors in the Aegean, all the characteristic forms of Egyptian architecture have become obsolete; the Greeks moreover, in adopting any feature, so modified and improved it that it became, in reality, their own. Greece, not Egypt, was the true parent of European architecture; yet the colossal monuments of the Nile valley had weathered twenty-five centuries before Grecian architecture had left its cradle.

In almost all countries we find that the chief structures are the outcome of the nation's religious beliefs. Such was the case in Egypt from the earliest times. Nothing reveals the character of the nation

2. THE PYRAMIDS AT GIZEH, WITH THE GREAT PYRAMID OF CHEOPS IN THE BACKGROUND

3. THE TEMPLE OF HORUS AT EDFOU. VIEW INTO THE COURT SHOWING THE FRONT OF THE HYPOSTYLE HALL

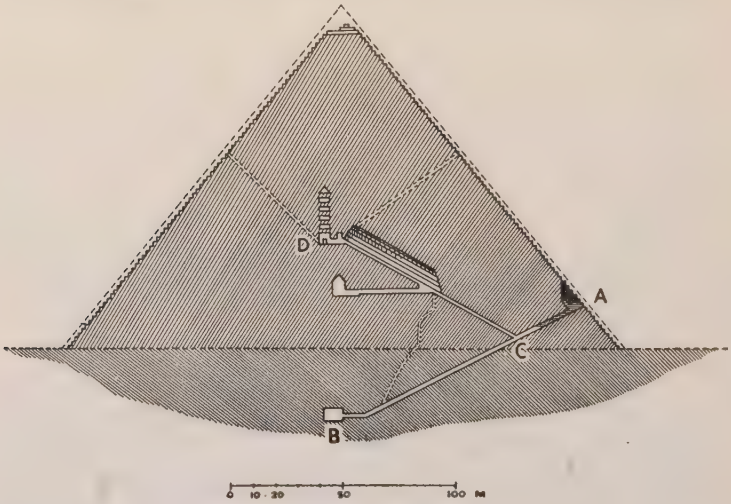
4. THE COLOSSI OF RAMESES II AT THE GREAT TEMPLE OF ABOU SIMBEL

so clearly as its religion; nothing has a more permeating influence upon its architecture. The Egyptians were a highly civilised, but in no respects an intellectual people; they were essentially religious, with a very lengthy catalogue of deities; they themselves spoke of their "thousand gods", and, in addition to their many principal deities they paid religious regard to animals in the bodies of which it was believed that the gods were able to manifest themselves on earth. Cats, dogs and many of the common animals were held sacred; at death their bodies were embalmed, and interred in specially constructed tombs. When a sacred bull, or Apis, died, the funeral would be on a most elaborate scale. The remains were embalmed, placed in a solid granite sarcophagus weighing fifty tons or more, and deposited in one of the long galleries hewn out of the solid rock.

It will be readily seen, then, that this phase of the nation's religion was productive of a vast amount of architectural work. But of far greater importance in its influence upon the architecture of the country was the belief held by the Egyptians regarding man's life after death. While the bad soul was destroyed irrevocably, the good soul, as its reward, became the companion of Osiris, "god of everlastingness", in the heavenly fields for a long space of time; and the human personality or *Ka*, separated at death from body and soul, had to be kept near the preserved remains by the ministrations of the living, supplied with food, drink and habitation lest it should wreak vengeance or wander beyond recall and thus prevent the eventual reconstitution of the departed once again into human shape, to enjoy without stint and for time unending, all the pleasures of a material but care-free world. Thus the care for the future beyond the grave was infinitely more important than well-being in the present. The living gave of their best to serve the intermediate needs and to secure the ultimate blessed welfare of the deceased; partly from mystical fear and partly with an eye to their own coming fate. Bodies were embalmed or otherwise preserved, personal possessions of the deceased, intercessory offerings to the gods and amulets against mischance were interred with the remains, and tombs were made as firm and secure as means would allow against violation by thieves and the erosion of time. The tombs of the dead and the temples of the gods were richer and more abiding by far than the habitations of man.

The most colossal, and almost the oldest, of the sepulchral monuments are the mysterious structures with which, among the inhabitants of Europe, the name of Egypt has always been associated—the Pyramids,

One at Sakkarah, built by King Zoser in the third dynasty, was not truly pyramidal, but rose in a series of six gigantic, jagged steps of approximately equal height, to a flattened apex at about 204 feet. The base was rectangular, not square—411 feet by 358 feet. This initial experiment, the "Step" pyramid, was followed by two others in the reign of Seneferu, the first of the fourth-dynasty pharaohs, at Mêdûm



5. SECTION THROUGH THE GREAT PYRAMID

and Dahsur. Next in order were the three at Gizeh, near modern Cairo, the largest and by far the best known, built respectively by Cheops, Chephren and Mykerinos, (to use the Greek form of their names), all fourth-dynasty kings (2). The pyramid of Cheops, built about 2900 B.C., generally known as the Great Pyramid, is the most important of the three, and gives us proof of the remarkable geometrical accuracy of which the Egyptians were capable and their very great skill in mason-craft. The square base, founded directly on the rock, was originally of 756 feet side, but the outer layers have been removed and used as building material in Cairo, so that the dimension now is reduced by some twenty feet. The area of the base is more than thirteen acres, twice the extent of the vast church of St. Peter's at Rome. The four sides were of the form of equilateral triangles, sloping towards and meeting at the top, at a height of 481 feet (now only 451 feet) above the level of the platform. Local stone was chiefly used in its construction,

but over this almost solid core of five or six million tons of masonry was an exterior facing of polished limestone, almost every vestige of which has disappeared from the site. The internal passages are still lined with highly polished granite slabs, fitted together with astonishing accuracy.

The entrance was at the point marked A, (5) about 55 feet above the original base, and was carefully concealed, extraordinary precautions having been taken to prevent the tomb from being entered. From the entrance a passage slopes down to a chamber, B, cut in the solid rock 120 feet below the natural surface of the ground. The object of this chamber is not apparent; possibly it was intended as a blind. A corridor, turning off at C, leads up to the royal burial-chamber, D, situated almost in the centre of the structure. Below this is a third room, called the " Queen's Chamber ", though there is no authority for the name. The chambers and corridors are interesting constructionally, for they show the methods adopted by these early engineers for bridging over openings in order to resist a superincumbent weight. The central corridor is 28 feet high, with a ceiling formed by courses of masonry which overhang one another successively until they meet at the top. In the case of the " King's Chamber ", in which the royal sarcophagus was deposited, marvellous ingenuity was displayed in blocking off the tomb-chamber from the passage, and also in making the roof strong enough to prevent the weight overhead from crushing through. To relieve this weight there were five successive series of enormous stone beams, laid horizontally side by side in each series, and with small chambers between the tiers; the whole surmounted by a rudimentary vault, contrived by pairs of massive stone slabs tilted against one another in a form like a ridged tent.

How this gigantic enterprise was carried out in all its details continues to be debated, but it is now known that although the majority of the stone was quarried nearby, the facing blocks were brought from Tura, a matter of eight or nine miles from the pyramid site, on the opposite, eastern side of the Nile. A road was specially made and the great stones were laboriously trundled along on rollers overland, and transported by ferry across the Nile. Herodotus, who visited Egypt about the middle of the fifth century B.C. tells us that earthen ramps (inclined planes) and wooden machines were used to manœuvre or lift the stones into position. The Egyptians were very skilful in transporting heavy material by land and water; single stones of as much as 450 tons, such as was used later for an obelisk at one of the temples,

were transported along the Nile on special barges, as we know from wall sculptures which show the method employed. The labour needed in these stupendous operations was almost incredibly large. It is stated by Diodorus, who visited Egypt about 40 B.C., that 300,000 men, working in gangs of ten thousand, were employed in the works occasioned by the building of the Great Pyramid, half of their time spent at the quarries and half upon the site. The making of roads, earthen ramps and innumerable embankments, though in themselves colossal undertakings, would represent but a fraction of this vast amount of labour. Some of the blocks of stone measure 20 feet in length and weigh as much as twenty tons, yet they were worked with the greatest exactitude; the polished granite slabs which line the corridors are fitted together with such accuracy that it is almost impossible to detect the joints.

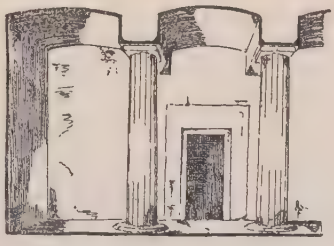
Such a vast, unremunerative work could only have been undertaken by a despot with an unlimited amount of labour available. At this period there were few prisoners of war—though we know that the previous king, Seneferu, took 7,000 men prisoner in Nubia, south of Egypt, higher up the Nile—so that the burden of the task fell mainly upon the shoulders of the King's " free " subjects. At the period of the annual inundation of the Nile, from July to October, the land could not be tilled, so the pharaohs had an almost unlimited supply of labour available at such times. The royal tyrant failed, however, in the one object to which his efforts were directed—the safe preservation of his embalmed remains. The secret of the prison-house was discovered, the tomb rifled, and the royal dust scattered to the four winds of heaven. In the words of Byron's doggerel:

> Let not a monument give you or me hopes,
> Since not a pinch of dust remains of Che-ôps.

The custom of embalming led to the erection of a vast number of smaller tombs, many of which are found in the neighbourhood of the pyramids, for this locality was originally the necropolis of the ancient city of Memphis. These tombs were usually rectangular, with sloping sides, like a pyramid with the top cut off. Internally the walls were often decorated with paintings illustrating the everyday life which the occupant had led, the evident intention being to make his *Ka* feel as much " at home " as possible in the tomb. These paintings have been invaluable in enabling us to realise the exact conditions of life which prevailed at the period. The material employed in the construction

of the tombs was sun-dried brick until the fourth dynasty, when limestone became usual.

It will be seen that the interest attaching to these earliest structures of Egypt is mainly historical, for they can lay little claim to architectural merit, in the true sense of the word. The object which the builders had in view was to make their monuments, not beautiful, but everlasting; and to this end all the refinements were sacrificed. Architecture was treated by them as one of the exact sciences, rather than as a fine art. In the tombs of a later period, however, belonging to the eleventh and twelfth dynasties (*cir.* 2300-2000 B.C.), a more fully developed architectural style is seen. At Beni-Hasan, on the East Bank of the Nile, in Middle Egypt, is a group of tombs of this period, cut in the vertical face of the rock, in which we find the first examples of an important architectural feature, which possibly may have influenced the architecture of Greece, and, through it, of Europe.



6. SECTION THROUGH TOMB AT BENI-HASAN

The general view (6) of one of these tombs shows an interior with two columns. The whole has been carved out of the solid stone, and two piers have been left in order to give support to the rock ceiling. It will be noticed that the portion above the columns has been squared to the form of a lintel. Over this, in a similar position outside, appears a row of dentils, or tooth-like projections, which are eminently suggestive of the ends of rafters, such as would be used in timber construction. The columns taper towards the top, and are surmounted by a square slab, or " abacus ", which has the appearance of transmitting the weight from the lintel. Some of them are polygonal, with sixteen or thirty-two sides, each side being slightly concave, in the manner of the " flutes " of the Greek columns, which we shall be considering in the next chapter.

If these shafts be compared with the columns of the Greek Doric order (21), it will be seen that there are some notable points of resemblance—the square abacus, the fluted surface, and the upward tapering outline. The general resemblance makes it tempting to surmise that the Greeks borrowed the type from the Egyptians and made it their own, but whilst it is not altogether impossible that there is a historical

connection between the two, the likelihood is that they were independently evolved.

The Egyptians did not often use the type of column seen here at the Beni-Hasan tombs, though it was one of the first kinds to appear and emerged again from time to time. The earliest example in stone occurs in the funerary temple attached to the base of the Step pyramid at Sakkarah, built by King Zoser. Much more representative of their practice are the columns designed in imitation of bundles of Nile reeds, since reeds were a far more prevalent material than wood, and served throughout the Egyptian period for buildings and minor works of all kinds.

The ceiling of the Beni-Hasan tombs, although cut out of the solid rock, is divided by lintels into three spaces, curved in the form of segments of a circle, in evident imitation of an arched, or vaulted, ceiling. Arched construction finds no place in the great buildings of the Egyptians; but that these old builders were familiar with the true principles of the arch has been proved by the discovery of brick vaulting of the sixth dynasty (*cir.* 2600 B.C.), and the still earlier barrel-vaulted passage in a king's tomb of the third dynasty (*cir.* 3000 B.C.), discovered by Professor Flinders Petrie.

Between the date of the Beni-Hasan tombs and the great Theban period of the eighteenth and nineteenth dynasties—an interval of about three centuries—little progress appears to have been made in architecture. During part of this period Egypt—or, more correctly, Lower Egypt—was in the hands of the " Shepherd " invaders, of whom we know little. Throughout their long rule they were hated by the Egyptians, and they left few permanent memorials behind them: but with the expulsion of the " Shepherd " kings began an era of great architectural activity lasting for about four hundred years, beginning at the period assigned to the exodus of the Jews (i.e. from 1580 to 1205 B.C.). This was the great temple-building age, the " Theban period ", which witnessed the culmination of Egyptian power and artistic greatness, and produced the greater number of the noblest buildings in the country.

The cause of this architectural revival is not far to seek. Before the period of the Shepherd kings, and during their rule, the inhabitants of the Nile valley had not been a fighting nation. But when Aahmes I. ascended the throne of Upper Egypt (*cir.* 1580 B.C.), he set himself the task of ridding the country of the invaders, and, after pursuing them into Palestine, completely routed them. As a result of this victory,

many thousands of slaves were brought back by the king on his return to Egypt. These advantages, and various successes over the Syrians, whetted the appetites of the Egyptians for further conquests, and they henceforth became a nation of conquerors. Under Thothmes III. (*cir.* 1501-144 B.C.), their "sphere of influence" advanced by leaps and bounds. Each year witnessed new expeditions, which brought into the country not only enormous quantities of treasure, but vast numbers of prisoners of war—for the object of the king was to capture rather than to kill. This wholesale importation of captives had an immediate effect upon the architecture of the country. By their forced labour, Thothmes was enabled to erect temples and other vast structures which placed him in the first rank of Egyptian builders.

The great city of this period was Thebes—the "hundred-gated Thebes" of Homer—which was practically the capital of the country. Memphis, situated farther north, nearer to the delta of the Nile, vied with Thebes in the magnificence of its temples; but its remains which have come down to us are comparatively unimportant, owing to the fact that the site has been used as a quarry for the supply of materials to Cairo and adjoining modern towns. Thebes, however, was more fortunately situated; no great city has sprung up in its neighbourhood, and its buildings have suffered only from the wasting hand of time, more merciful than that of man.

The great building monarchs of the Theban period were Thothmes III., Amenhotep III., Seti I. and Rameses II., each of whom endeavoured to surpass the efforts of his predecessor with some "new temple, nobler than the last". Their names, it will be seen, appear in connection with the greatest temple structures of this era.

The most imposing of all the Theban buildings was the great temple at Karnak, 1,200 feet long, around which were grouped several smaller ones. At Luxor, two miles farther south, was another vast temple complex. The groups on the opposite bank of the river included the sepulchral temple of Amenhotep III.—second only to that of Karnak—and the Ramesseum, built entirely by the great Rameses.

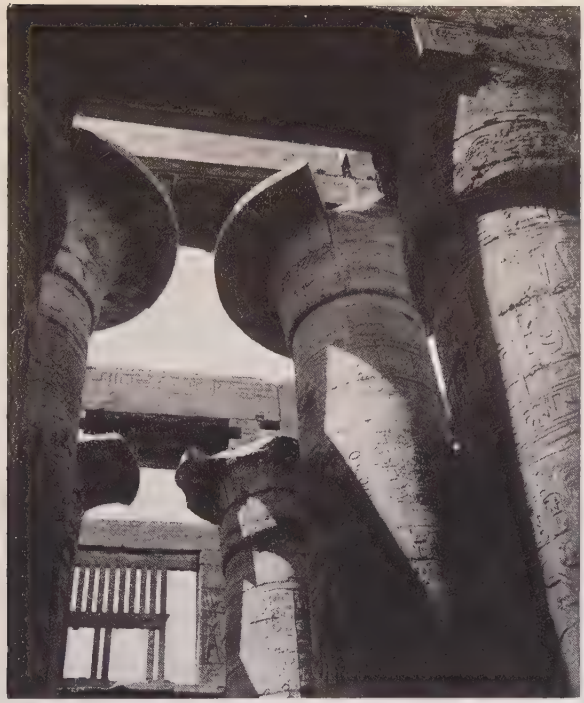
The principal work of Thothmes was the rebuilding of a portion of the great temple at Karnak. Isolated examples of this master-builder's work are familiar to Europeans. In front of the grand entrance to the temple at Karnak he erected two obelisks; one of these, which now stands before the church of S. John Lateran in Rome, is the largest and most splendid monument of its kind extant. He built, or added to, temples at Heliopolis, Abydos, Denderah, Memphis and many other

places, both in Egypt and in Nubia. An obelisk of this monarch has been re-erected at Constantinople; another, which stood originally at Heliopolis and afterwards at Alexandria, is now to be seen on the Thames Embankment, where we know it as " Cleopatra's Needle "; its companion has crossed the Atlantic and has been erected in New York.

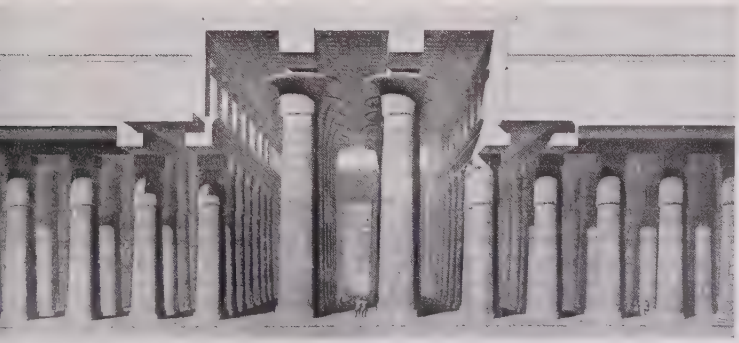
Amenhotep continued the building of the temple at Karnak, and erected a vast new temple on the west bank of the Nile, of which, however, hardly a trace remains, for it was pulled down, perhaps by Rameses II.; but an enduring memorial of the king, and of an architect bearing the same name, survives in the two mutilated colossi about fifty-six feet high, of which one has been known, since the days of the Greeks, as the " vocal Memnon ", for the reason that a mournful but melodious sound used to issue at sunrise from a crack in one of the statues, perhaps caused by air movements arising from temperature changes between night and day.

By far the greatest and most impressive of all the buildings of this period was the grand temple of Ammon at Karnak. Like many of our mediaeval cathedrals, this was the work of successive kings and generations; its walls and columns, covered with inscriptions, furnish almost a complete history of the Theban kings.

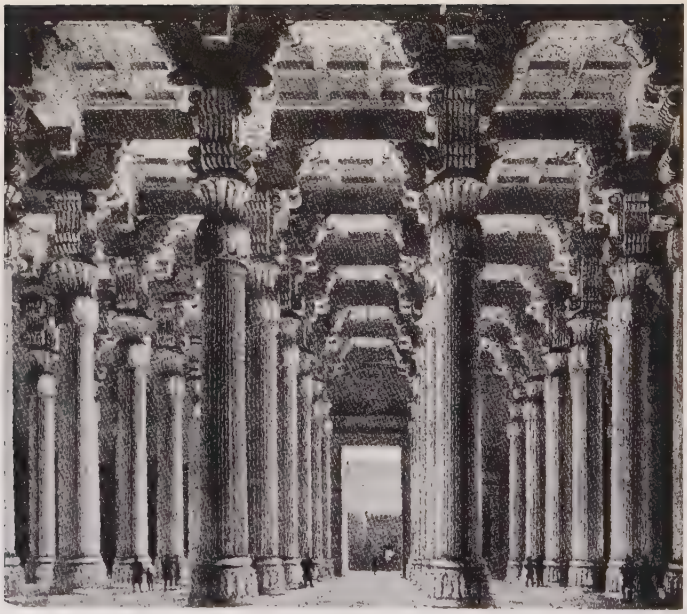
The temple was begun by Amonemhet I., the great king of the twelfth dynasty (*cir.* 2200 B.C.). After an interval of several centuries, Thothmes I. continued the work, adding a courtyard surrounded by a colonnade of Osirid pillars. Thothmes III. constructed a magnificent columnar hall, 143 feet by 53 feet—dimensions which had never before been approached in a building of this form. He also set to work to restore the ancient sanctuary of Amonemhet I., reverently preserving all the lines of the old building, and recording the details of the restoration in an inscription on the walls. But the great glory of the temple was the Hypostyle Hall, begun by Seti I. (*cir.* 1320 B.C.) and completed by Rameses II. (*cir.* 1301). This was the most imposing structure in the world's history, and is familiar to all travellers in modern Egypt. The hall (8) measured 340 by 170 feet, its massive roof being carried by 134 columns in sixteen rows; the shafts of the two central rows, which supported the higher portion of the roof, were more than 60 feet high and almost 12 feet in diameter. " No language," writes Fergusson " can convey an idea of its beauty, and no artist has yet been able to reproduce its form so as to convey to those who have not seen it an idea of its grandeur. The mass of its central piers, illumined by a flood of light from the clerestory, and the smaller pillars of the wings



7. THE TEMPLE OF AMMON AT KARNAK. VIEW ACROSS THE HYPOSTYLE HALL SHOWING THE SLOTTED CLERESTORY WINDOWS

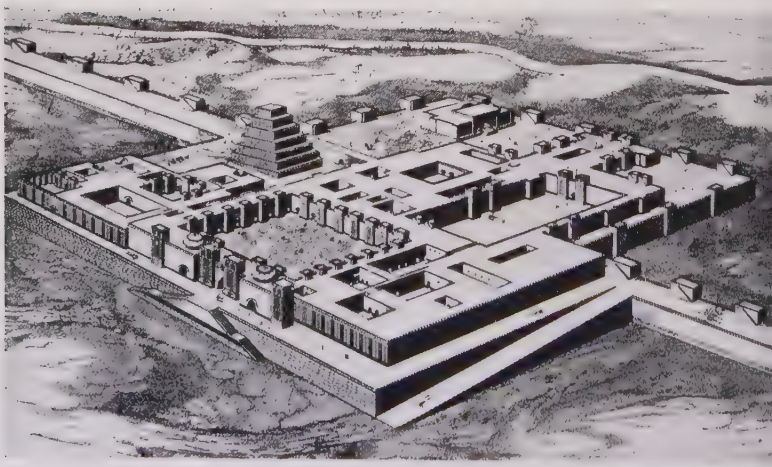


. THE INTERIOR OF THE HYPOSTYLE HALL, KARNAK. DIAGRAM ILLUSTRATING THE METHOD OF CLERESTORY LIGHTING



9. VIEW OF THE HALL OF XERXES, PERSEPOLIS

From the drawing by R. Phené Spiers



10. RESTORED VIEW OF THE PALACE OF SARGON AT KHORSABAD

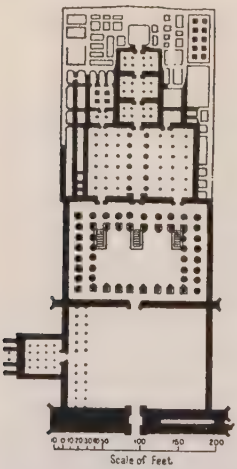
gradually fading into obscurity, are so arranged and lighted as to convey an idea of infinite space (7); at the same time the beauty and massiveness of the forms, and the brilliancy of their coloured decorations, all combine to stamp this as the greatest of man's architectural works, but such a one as it would be impossible to reproduce, except in such a climate and in that individual style in which, and for which, it was created." The columns were very massive as always was the case in Egyptian temple architecture, because of the very weighty stone-beamed roofs, and they were built up in courses of separate stones, not in single monoliths as was often the case in Roman architecture, later on.

It would have been impossible for the Egyptian monarchs to erect such stupendous structures but for the fact that they were able, through their victorious wars, to bring into the country vast numbers of captives, whose lives were spent in forced labour upon these public works. In a series of interesting tomb-drawings, referring to the building of this temple at Karnak, we find depicted the tasks upon which the prisoners were continually occupied. Some are busy kneading clay; others either make bricks in wooden moulds, or spread them in rows to bake; others carry on the building operations. By the side are explanations of the drawings; part of the inscription is worth quoting: " We see the captives who were carried away as prisoners in very great numbers; they work at the building with skilful fingers. Their overseers show themselves in sight: these attend with strictness, obeying the word of the great skilful lord of the works; . . . they are rewarded with wine and all kinds of good dishes; they perform their service with a mind full of love for the king; they build for Thothmes III. a holy of holies. May it be rewarded to him through a number of many endless years ! The overseer speaks thus to the labourers at the building: ' The stick is in my hand; be not idle.' " Such a picture enables us to realise the conditions under which these colossal buildings laboriously came into existence—the slave population toiling unceasingly at the point of the goad, while the task-masters, by their exacting severity, earned for themselves a share of the good things of this life.

After the death of Rameses II., about 1234 B.C., a change came over the land; the Egyptians lost a great number of their slaves, and, as a result or a coincidence, the era of temple-building practically ended with his reign.

At Karnak the chief object of each monarch was to surpass, in extent and magnificence, the buildings of his predecessors, without

regard to congruity of plan. But in the Ramesseum at Thebes, a temple wholly built by the great Rameses, we see the plan of a typical temple of the period (11). The façade was formed by a pair of massive pyramidal towers (pylons) embracing the entrance doorway. The doorway gave access to a great fore-court, flanked by colonnades, which in turn led to an inner court, smaller than the first, but more richly decorated with statuary. Courts such as these were open to the sky, and served, no doubt, as an assembly place for the laity on festival days, where among the throng, busy vendors would sell amulets, offerings and religious emblems.



11. PLAN OF THE RAMESSEUM

Beyond these we reach the Hypostyle Hall —the chief feature in the larger temples, a room of dim, holy half-light, its gloom pierced by rays of sun striking through the narrow window slits up near the stone roof. Down the centre, from front to back, an avenue of two rows of lofty columns supported the higher portion of the roof, the remainder of the space being occupied by ranges of smaller columns. The central portion of the roof was higher than that at the sides, an arrangement which allowed light to be admitted through perforated stone panels, fixed in the wall, which connected the upper portion of the roof with the lower, in the manner of the clerestory windows of Gothic architecture (8). Beyond this hall was the " holy of holies ", the shrine of the god or gods to whom the temple was dedicated, entered by no other than the king or priests. Centrally within it was a sacred symbol, emblematic of the deity. Around the sanctuary were other rooms, for the use of the priests and for the storage of sacred properties and the ceremonial regalia used in the rites and the many religious processions. One of the rooms housed the temple library.

The columns were brilliantly coloured, and their capitals were varied in design to suit the positions in which they were placed, with due regard to the light; those of the lofty and well-lighted central pillars were bell-shaped, but the columns at the side had bud-shaped capitals—wide at the base and tapering towards the top—a form which allowed the decoration, lighted from above, to be seen to advantage.

Pyramids continued to be built throughout Egyptian times, but those following after the first six dynasties were relatively of little consequence. Pharaohs of the eighteenth and nineteenth dynasties preferred rock-cut tombs; and near Thebes is the Valley of the Tombs of the Kings, a grim winding depression through the sun-baked, arid cliffs, wherein are cut the "corridor" tombs—tortuous passages alternating with a succession of chambers which comprise the last resting place of the mightiest and most famous of Egypt's monarchs.

Rameses II., called "The Great", though with less justification than was at one time thought, for he took credit for a good deal of building that was not properly his, carving his name on monuments at the least or no excuse, was nevertheless a great builder, and besides the works already mentioned, commissioned two rock-hewn temples at Abou Simbel; one, the Great Temple (4), with a façade of vast and impressive dimensions, incorporating four identical statues of himself, over 65 feet high. The façade was preceded by the usual colonnaded forecourt, and within the rock itself was a great hall—divided by two lines of supports faced by effigies of the god Osiris—as well as eight smaller chambers leading from the hall.

After the nineteenth dynasty ensued a long period of decay and inactivity, apart from brief interludes, lasting for almost a thousand years, until the old glories of Egypt were, to some extent, revived by the Ptolemies. Under their rule and, later, under the Romans, the land enjoyed again a season of great prosperity. Temples were erected which vied in size and splendour with those of the great Theban age. Imposing temples of this period are found at Denderah, Edfou, and on the Nile island of Philae, in upper Egypt. As evidence of the conservatism of this old nation of builders, it is interesting to note that the structures of this period bear no obvious trace of Greek or Roman influence, either in the architectural details or in the decorations which covered the wall; so that, until their true place in history was assigned to them through the interpretation of the hieroglyphic inscriptions, some of the Ptolemaic buildings were considered to be anterior to those of the great Theban period.

Egyptian civilisation was, in fact, a matter of routine. During thousands of years there was no great intellectual awakening in the art and architecture of these mighty builders; there was little development or growth. "The civilisation that we find before us in the earliest known history," writes Professor Petrie, "appears elaborate and perfect. Few discoveries of importance were made during the thousands of years

which ensued." But the buildings which remain to us are wonderfully impressive, and shed a vivid light upon the habits and lives, as well as upon the limitations, of these early Egyptians.

A comparison between the Temple at Edfou (3), commenced by Ptolemy III. in 237 B.C. and finished by his successor, and the Rameseum (11), will show how few had been the modifications in the course of a thousand years. There was still the stately ceremonial approach, a processional-way lined by closely-spaced, human or animal headed sphinxes—just as had joined the two great temple complexes of Karnak and Luxor—a long perspective terminated by the towering, sloping-sided masses of the pair of pylons, linked by the entrance portal and ornamented by bannered masts and vividly-coloured shallow carvings. The crowning cornice and the roll mouldings at all the outer vertical angles were in no whit changed. Behind the dominating frontispiece, court preceded hypostyle hall and sanctuary apartments as before, in descending order of size, enclosed within a high containing wall, externally blank and unrelieved by ornament or incident of any kind. Apart from the pylons, architectural effects remained wholly internal.

Yet some changes there were; none of surpassing importance, but sufficiently strongly marked to distinguish the work of the one great period from the other. In the Ptolemaic and Roman period temples, the hypostyle hall no longer had the clerestory mode of lighting; instead, the wall facing the court was omitted and the outer range of columns was exposed to view, linked by solid screens reaching about halfway up their height and allowing the admission of daylight through the openings remaining.

Very typical of this latest period was the treatment of the head of the subsidiary doorways. The main portal within the pylons was indistinguishable from the Theban period type, but the lesser doors were peculiar in that the central part of the lintel and of the characteristic and inevitable "gorge" moulding above it were omitted altogether. The object doubtless was to allow free passage for processional banners, staves and effigies. Processions had a very notable place in Egyptian ceremonial, and the fact explains many features of the disposition of the religious buildings at all periods of the civilisation. The special circumstances of the door design, referred to above, and the existence at Edfou of a complete and unobstructed passage way just within the circuit of the main enclosing walls, suggest that processions had assumed a still greater importance in the last phase than ever before.

Column capitals were much more varied in design than formerly.

New types appeared and differing patterns were used side by side in the one building. The abacus above the capitals, always rather deep in Egyptian use, became excessively so—almost cube-shaped.

That the Egyptians drew their inspiration for column design so largely from reeds and aquatic plants is not surprising, for the Nile was the cradle of Egyptian life and its waters the ultimate source of sustenance. Reeds were an important material in domestic and everyday architecture. At the present day, bundles of reed plastered with mud may frequently be seen in use as columns; several small bundles, each tightly bound, are banded together and form a shaft sufficiently rigid to support heavy weights.

For the interior of the temples colour, rather than form, was relied upon for decorative effect. In the dim light of the columnar halls, mouldings and carving could not have been seen to advantage, and brilliant colouring was essential. The walls and columns were covered with a profusion of hieroglyphic inscriptions and of paintings, in which the designs were either outlined or cut in low relief before the colour was applied. Where coarse sandstone had been used in the erection of the building, a smooth surface for the colour was obtained by the use of stucco, with which the imperfections of the stone were filled up.

All Egyptian monuments of consequence were religious in character; other buildings were largely of mud brick and reeds and have perished leaving scarcely a trace. Even the king lived in a mud brick palace, with a little stone here and there for such as steps and internal pillars. The palaces were within or near to tremendously large sacred enclosures wherein the temples stood, and these precincts served too for the abodes of the priests and their wives and families, for administrative buildings and barracks, and for the storage buildings for reserves of food, oil and wine. In times of stress the sacred precincts became a fortress refuge, protected by the enormous walls of crude brick or earth, with pylon gateways at infrequent intervals. The houses of nobles were similar too, but on a more humble scale than the royal palace. The rooms of the houses were arranged around three sides of a court, a portico occupying the fourth. Window-slits, small and high up the walls of the rooms, faced inwards to the court and not outwards to the street. Despite the inpermanence of the walls and structure generally, the homes of the great and well-to-do were luxuriously furnished and the walls were plastered over and gaily coloured, whilst the ceilings of the principal rooms might be of painted cedar or other rare, imported woods. Floors were of very hard plaster, painted, or of patterned

tiles. Beyond the courtyard dwelling there was a large walled enclosure with out-buildings of various kinds and a fruit and flower garden of which an almost invariable feature was an ornamental pool. The peasantry lived, as now, in humble rough huts of mud, or of reed framework daubed over with the mud.

West Asiatic Architecture

Akin in antiquity to the civilisation of the Nile valley was that of Western Asia, nourished in the basin of the two great rivers, the Tigris and the Euphrates, the region which the Greeks called Mesopotamia—the land between the rivers—traditional location of the biblical Garden of Eden. Not less ancient than the culture of Egypt—its origins have been dated as early as 5000 B.C.—we may recognise three historical phases in the course of its development; the Babylonian (or Chaldean), roughly from 4000–1275 B.C.; the Assyrian, 1275–538 B.C.; and the Persian, 538–333 B.C. In the geographical sense Babylonia and Assyria were one country, and the peoples assumed dominant power in turn, but the Persians were aliens, occupants of the high table-land east of the delta of the twin rivers, and first entered West Asiatic history as conquerors of the fat, valley lands.

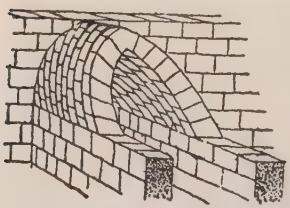
As was the case in Egypt, the character of the country had a direct bearing on the nature of West Asiatic architecture. The lower, southern, region of the country where the Chaldeans dwelt was a flat alluvial plain, completely devoid over the greater part of even a pebble of stone and where there was ever-present danger of devastating floods, occasioned by protracted spells of heavy rain. The aftermath of the floods was the creation of miasmic swamps, dangerous to health in the summer heat. Clever irrigation made the country bounteously fertile, but for safe habitation from floods and disease, the Chaldeans had to construct colossal artificial mounds with the only available material, brick, sun-dried for the core and faced with coloured glazed bricks to resist the elements. For mortar they used natural bitumen, available from springs at It, on the Euphrates, and elsewhere. In the upper reaches of the rivers, the part occupied from ancient times by the Assyrians, stone was more readily procurable and was plentiful enough in the north, but the Assyrians imitated the Babylonians in the extensive use of brick.

Unfortunately the crude bricks soon fell into irremediable decay, once the outer resistant covering had succumbed to the elements, and of the former Babylonian monuments, little now remains but shapeless

mounds. Babylon, which became the capital about 2000 B.C., we know, was a wondrous great and fair city of grand dimensions, seated astride the river Euphrates, with streets formally planned on rectilinear, " chess-board " lines, girt about with immense walls embodying numerous bronze-gated towers. The palace of Nebuchadnezzar was located there, of which the terraced gardens, standing on arches some 75 feet above the river, were ranked among the seven wonders of the known world. In other towns, Ur of the Chaldees, Nippur and elsewhere, remains are sufficiently legible to show that temple enclosures were among the structures of major importance—probably the chief. They stood on tremendous platforms, raised high above the surrounding featureless plain, approached by sloping causeways and staircase flights; vast, walled enclosures which, like the Egyptian temple precincts, were almost towns in themselves, serving as centres not only of religious but also of social life. Among the buildings, the sacred element proper was a pyramidal observatory tower, known as a ziggurat, which had a small platform at its apex, from whence the astrologer priests transmitted their prophecies and divinations. There was such a tower at Babylon, the " Tower of the Seven Planets ", and traces of others have been found on many ancient sites. The ziggurat observatories varied in design between two main types, of which the simpler is well represented by an example from Birs Nimroud, a pyramid 272 feet square on base and 160 feet high, solid cored with sundried bricks but arranged in seven vertical-faced tiers, each faced with glazed bricks of a different colour. An inclined approach-way circulated the tower to reach the small flat area on top, where stood a simple shrine.

Evidences of the Assyrian period are somewhat more clear. Palaces are the principal class of remains, though little survives beyond the foundations, apart from sculptures and carved relief slabs. Excavation which have been carried on at Nineveh, the capital, and at Khorsabad, have revealed almost complete plans of the royal dwellings, showing that they were of remarkable extent and magnificence. Portions of the great gateway of the palace of Khorsabad may be seen in the British Museum. The immense size of this portal, with its human-headed winged bulls 19 feet high, enables us to form some opinion of the massive grandeur which characterised these vast buildings of the Assyrians. Like the temples of Babylonian days, the palace stood upon a grand, high platform, approached by inclined ways and stairs. The plan was complicated and far from symmetrical (10). The apartments

were arranged around open courts, the largest of which was 340 by 290 feet. Walls were immensely thick, of brick except for a limited use of stone at a few points, including the main portals, and the rooms were narrow and long in proportions so that they might be spanned by tunnel-shaped vaults, of sundried brick like the walls, erected by an ingenious method without the temporary aid of timber supports—as timber was very scarce. We have not definite proof that the vaults were so constructed, as none survives in place, but we assume that the principle used for these upper vaults would be the same as that employed for vault coverings over some large drains found in the platform. The method is shown in the diagram (12), from which it will be seen that the large mud bricks were laid in inclined rings in such a manner as to be self-supporting, the only aid needed being that of a high end wall, at one extremity of the space to be vaulted, against which to lay the first, partial brick rings. The ultimate vault would be pointed in section. This evidence of knowledge of vaulting is important; and that the Assyrians were quite familiar with the true arch principle—in which wedge-shaped units are used, with joints radiating toward a common centre—is definitely proven by the remains of the great gateway mentioned earlier. The arch principle made it possible to bridge across spaces without the aid of timber, spaces much wider than could have been spanned even with the largest stone beams.



12. POINTED VAULT TO DRAIN UNDER PALACE PLATFORM AT KHORSABAD, SHOWING ASSYRIAN METHOD OF VAULT BUILDING

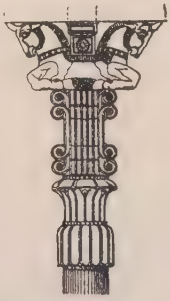
Architecturally, Assyrian walls were severe in character, the external decoration, such as it was, being a chanelling and reeding, cutting up the walls into vertical flat strips and panels. There were few, if any, openings other than the occasional doorways, and the wall tops were crested with double-stepped " battlements ".

On existing bas-reliefs are found representations of domed buildings, from which it may be assumed that this form of roof was not unknown.

The prominent feature in Egyptian temples—the column—did not occupy an important place in the architecture of the Assyrians; with the exception of the bas-reliefs, the existing remains reveal no trace of its use. The interior walls of the palaces were lined, to the height of about 10 feet, with alabaster slabs, on which were represented, in low

relief, battle and hunting scenes and mythological subjects. Many of these slabs are to be found in the chief museums of Europe.

With the Persians who, under Cyrus (538 B.C.), became masters of these older monarchies, another style of architecture was developed, which attained great magnificence under Darius and Xerxes. Before their period of conquest the Persians had been simple in their mode of life, with little architecture of their own. Under later monarchs, very different in character from the great conqueror Cyrus, they acquired luxurious habits, and soon surpassed even the Assyrians in the splendour and the extent of their palaces. Persian splendour and luxury culminated in the great capital at Persepolis, or Takht-i-Jamshyd (the Throne of Jamshyd), as it is still called by the inhabitants of the district, after its mythical founder and ruler. In the treasury of this great city it is said that Alexander, on his entry, found wealth to the amount of thirty millions sterling.



13. PERSIAN CAPITAL FROM PERSEPOLIS

Here the chief buildings rested upon vast platforms and terraces carved out of the solid rock, which still remain, while almost every vestige of the mighty halls and palaces which covered them has disappeared. With the exception of a few ruins, hardly a monument remains to mark the desolate site of the old luxurious civilisation:

> The Lion and the Lizard keep
> The Courts where Jamshyd gloried and drank deep:
> And Bahram, that great Hunter—the Wild Ass
> Stamps o'er his head, but cannot break his sleep.

The Hall of the Hundred Columns at Persepolis was undoubtedly one of the most extensive and imposing buildings of ancient times, 225 feet square, enclosed by a brick wall, 11 feet thick; an area as large as that of the great Hypostyle Hall at Karnak. Its roof was supported by lofty columns, 37 feet in height, fluted and slightly tapering. The Great Hall of Xerxes (9) was much about the same area but had fewer columns—thirty-six, arranged in six rows—and these were much taller than those in the Hall of the Hundred Columns; no less than 64 feet high, and about 4 feet 6 inches in diameter. Many of the capitals were of remarkable design, in the shape of a double bracket, formed by the forepart of two bulls placed back to back. Frequently, as in the illustration (13), a double girdle of slender leaves formed the lower

part of the capitals—very similar to one of the Egyptian forms—and, above this, a weak looking but extremely graceful feature consisting of a group of vertical scrolls. These scrolls are not unlike the volutes of the Greek Ionic Capital, but set vertically instead of horizontally. The wooden beams which supported the roof appear to have rested in the hollow space between the necks of the bulls. These curious capitals may be seen in the rock-cut tomb of Darius, carved out of the foot of the mountain adjoining the terraces, in which is represented, on a small scale, a copy of one of these splendid halls.

But although the vast empire of Persia, stretching from the Indus on the east to Thrace and Egypt on the west, absorbed almost every kingdom with which its hosts came into conflict, its architecture had little influence upon succeeding styles, or upon that of Europe. Far different might have been the result had the invading hordes overflowed Europe, and not been successfully resisted by those brave Greeks who

> Breasted, beat Barbarians, stemmed Persia rolling on,
> Did the deed, and saved the world, for the day was
> Marathon !

CHAPTER II

AEGEAN AND GREEK ARCHITECTURE

UNTIL recent times it was generally accepted as a fact that while Egypt, by its imposing architectural monuments, revealed to us a civilisation dating back thousands of years before our era, Europe was, by contrast, the real " Dark Continent ", which had not at that time emerged from its primitive conditions. The discoveries in Crete have, however, opened out a new horizon and have given us a new standpoint from which to survey early European history. In the remains of the mighty palaces of Knossos and elsewhere in Crete, and at Tiryns and Mycenae and other places in mainland Greece it has been possible to trace a European civilisation co-equal with that of Egypt, and in some respects surpassing in its achievements the works of the early Egyptian builders.

This early civilisation, to which the name of " Aegean " now is usually given, was approximately coeval with that of Egypt, coming into the fuller light of history about 3200 B.C. Its centre lay in Crete, where there are traces showing that the island had been in continuous occupation for thousands of years previously, back into the dim recesses of the stone age. The first notable developments corresponded, more or less, with the introduction of the use of copper and bronze. The other, neighbouring, Aegean islands then were settled by this ancient race, and from the Cretan maritime stronghold, powerful influences of the matured civilisation radiated to the mainland of Greece and eastwards to the neck of the Hellespont—where lay the venerable city of Troy—potently affecting the ruder cultures of immigrant Greek tribes drifting in successive waves from the north. The mainland settlers retained and developed their own characteristic kinds of building, attuned to the harsher climate to which they had been accustomed, but in the minor art forms, they accepted Cretan superiority. The civilisation flourished despite the recurrent checks occasioned by the successive northern invasions, and reached a climax in the years between 1650–1450; a phase closed by the irruption of the Achaean branch of the Greeks, which penetrated beyond the mainland at last to the fastness of

Crete itself, where the victors worked havoc in the many fine towns and cities. Nevertheless, the culture did not at that time collapse completely, for the Achaeans took up the native arts again as best they could, until finally, about A.D. 1100, an overwhelming drive of the Dorian Greek tribe swept all into historical oblivion for a space of some four or five centuries.

Aegean power and wealth came from commerce. Geographically the island was most favourably placed to serve as a mart and exchange for goods brought from ports of the neighbouring eastern Mediterranean lands, and as an intermediate calling-place for the trading vessels of the day, which were ill designed to hazard long, unbroken voyages. With commerce came artistic influence from far and wide, fusing there in Crete and bearing on the native art. Crete both learnt and taught, for her culture was highly advanced and no less individual than that of Egypt. To protect her trade from piracy and to guard her shores, she built up a powerful navy, and needed little other defence, for internally, the island was politically unified, under the leadership first of a town on the southern coast, Phaestos, and thereafter, for the majority of the historical period, under Knossos, situated on the northern shores. On the mainland the political conditions were different; at times there was a loose confederacy of the peoples there, but for the most part they were split into separate city states, needing well-chosen hill sites for their towns, girdled with massive, forbidding stone walls for their protection even in the uneasy periods of relative peace between the whiles that new bands of kinsmen came seeking a place in the sun of Mediterranean prosperity. The towns were many, but the relics now are few. Athens itself was one, and in classical times already prided itself on its ancient lineage. Mycenae, the capital (according to Homer) of Atreus and Agamemnon; and Tiryns, the mythical city of Perseus, are the most famous to-day, for there, time-worn monuments still survive above ground that have teased speculation throughout the centuries, but which only the discoveries in Crete have put into their true historical place. Defensive walls, fragments of the hall-residences remarkably resembling the temple structures of later days, and queer subterranean tombs are the principal remaining evidences of the mainland folk; on the island of Crete long-buried ruins and abundant art treasures, uncovered by archaeologists, tell of labyrinthine sumptuous palaces, halls of state, homes of noble retainers, and vividly of the way of life of a nation of merchant adventurers who built the first great maritime power of the Mediterranean.

Sir Arthur Evans, who has been so successful in his Cretan excavations, has made this subject peculiarly his own, so that we may be allowed to use his own words to illustrate the importance of the discoveries made by himself and his fellow-explorers. To this early civilisation he applied the name of " Minoan ", from Minos, the legendary king and law-giver of Crete, and this term has been generally accepted, though regarded now as applying alone to the Island centre, within the wider " Aegean " sphere of its influence.

" The marvellous Minoan civilisation," he writes, " that has there come to light shows that Crete of four thousand years ago must unquestionably be regarded as the birthplace of our European civilisation in its higher form. . . . Moreover, most recent investigations have more and more brought home the all pervading community between Minoan Crete and the land of Pharaohs. When we realise the great indebtedness of the succeeding classical culture of Greece to its Minoan predecessor, the full significance of this conclusion will be understood. Ancient Egypt can no longer be regarded as something apart from general human history.

" This high early culture, the equal rival of Egypt and Babylonia, which thus began to take its rise in Crete in the fourth millennium before our era, flourished for some two thousand years, eventually dominating the Aegean and a large part of the Mediterranean basin.

" It is difficult in a few words to do adequate justice to this earliest of European civilisations. Its achievements are too manifold. The many-storied palaces of the Minoan priest-kings in their great days, by their ingenious planning, their successful combination of the useful with the beautiful and stately, and last but not least, by their scientific sanitary arrangements, far outdid the similar works, on however vast a scale, of Egyptian or Babylonian builders.

" The modernness of much of the life here revealed is astonishing. The elaboration of the domestic arrangements, the staircases storey above storey, the front places given to ladies at the shows, their fashionable flounced robes and jackets, the gloves sometimes seen on their hands or hanging from their folding chairs, their very mannerisms as seen on the frescoes . . . how strangely out of place would it all appear in a classical design.

" Nowhere, not even at Pompeii, have more living pictures of ancient life been called up for us than in the Minoan palace of Knossos."*

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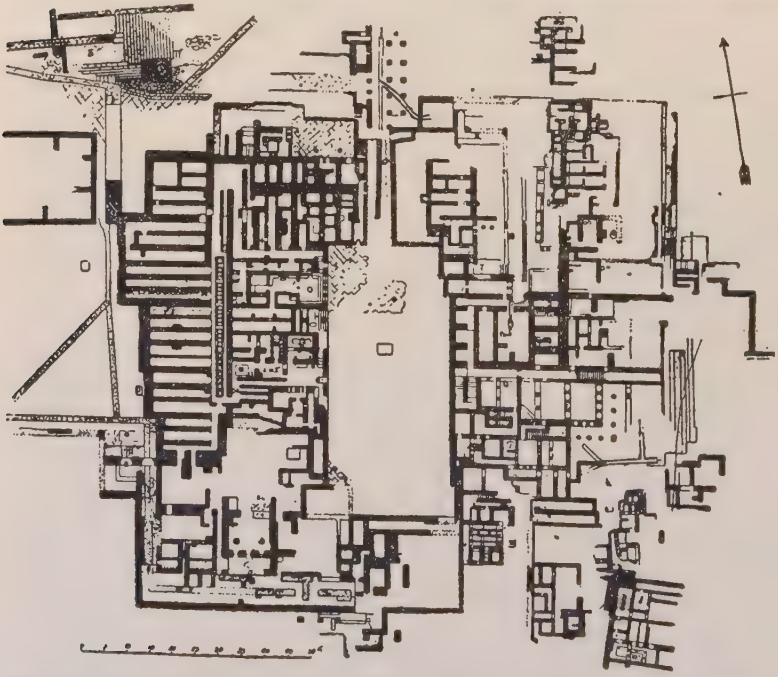
* Evans: " New Archaeological Lights, etc."

The palace at Knossos (14), was twice destroyed and was remodelled on a greater scale than ever in the "golden age of Crete" (*cir.* 1500 B.C.), but, as we have seen, within half a century it fell to the destroyer, and with it the era of splendour at Knossos came to an end. Little but the foundation of its complex buildings have survived to our own time. Meanwhile Mycenae and Tiryns were becoming important

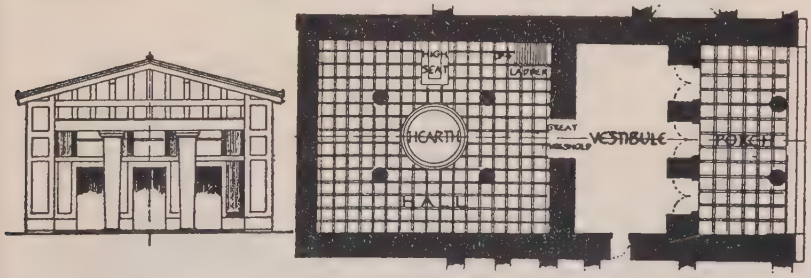


14. PLAN OF THE RUINS OF THE LOWER STAGE OF THE PALACE AT KNOSSUS

centres on the mainland, and with the steady decline in prosperity and in art which ensued at Crete the supremacy eventually was transferred to these capitals.

The earliest traces of civilisation and architecture on the mainland of Greece are later than those on the island of Crete, and there is a marked, and on the whole, persistent difference in the form and structural arrangement of the buildings, though in art and decoration the two are soon indistinguishable. The northern domestic building, which was fully evolved by 2000 B.C., was a kind of hall, with a double-

sloping, gabled roof; and in the limitations imposed by this feature, by comparison with island practice where roofs were flat, we may see how vastly architecture may vary in character in consequence of the form of the roof covering adopted to meet even slightly divergent climatic and social conditions. This northern residential hall (15), known, in its ultimate shape, as a " Megaron ", was a narrow, rectangular structure, in the bigger instances over thirty feet wide, entered from one end, where there was a deep porch leading through a door or doors into the main apartment or megaron proper. Behind this, sometimes, was a further, sleeping, apartment. In palace architecture, we find such units arranged side by side in groups of three, in descending sizes,

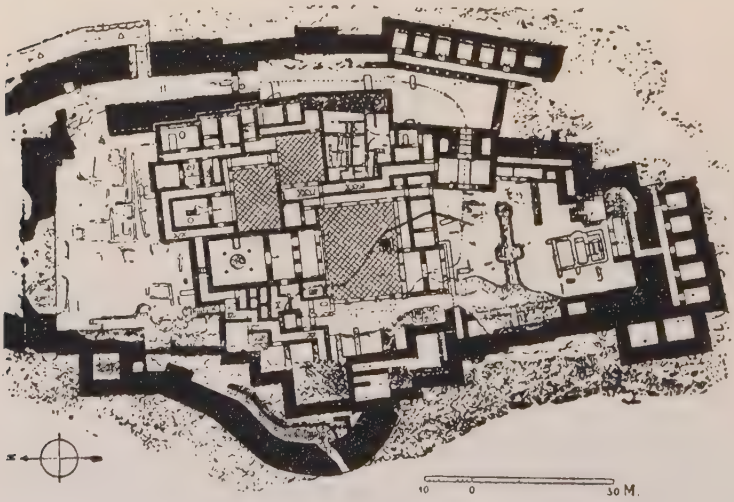


15. RECONSTRUCTION OF THE MEGARON AT TIRYNS

as at Tiryns or Troy; and they had a narrow passage between to allow rain-water to drip from the eaves. They were only one storey high, and had a slightly raised, round hearth in the main room, in the centre or a little to one side. There were columns, sometimes, across the front of the porch, and within also, where the size of the building demanded extra support for the roof.

The resemblance in nearly all essential features to the Classical Greek temple of later times is striking; the same kind of narrow plan, sequence of rooms, sloping roofs and columned front porches. There are parallels too, in the details of construction, for, as we shall see, the earliest temples of classical Greece were built much in the same way as well as in similar form. The lower parts of the megaron walls, to about " dado " height, were in cut stone, or, more often, rubble, and the upper walls were timber-framed in arrangements very like the " half-timber " mediaeval houses of this country, the panels infilled with large, well-made sundried bricks, all plastered over inside and out and tinted or painted with designs vaguely imitative of the pattern of

the structural timbers underneath. Columns always were of wood and differed from the early Greek only in the one main particular that they tapered downwards instead of upwards, the better to gather the weight of the wide, crude-brick walls above. The free ends of the walls embracing the front porches were strengthened by upright baulks of timber reaching down to the ground, and in such an arrangement we read the origin of the Greek *anta*, and after it, the Roman and Renaissance *pilaster*, just as in the timber baulk enframements to the megaron



16. PLAN OF THE PALACE AT TIRYNS

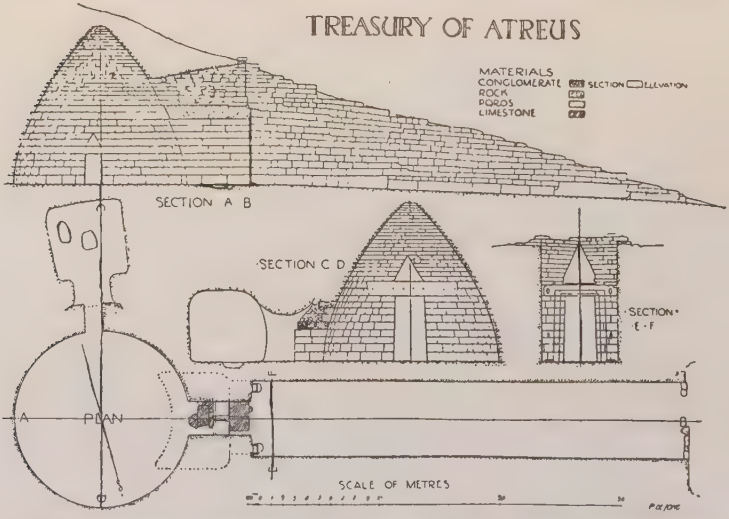
doorways, we find the prototype of the universal architrave. Yet despite all these resemblances, we must not infer that the Greeks began their architecture where the Aegeans left off, or necessarily borrowed extensively from them, for there is much evidence to show that the Classical style, arising anew after the lapse of several centuries, harked back again to the experimental stages. Because of the similarity of governing conditions, the Greek development in its early stages followed a like progression, but with the one important difference that almost at the outset, the normal Greek temple building appeared with a surrounding line of columns.

The mainland palaces, such as Tiryns (16) and Mycenae, included subsidiary buildings, some few of them in two storeys. The main

remains there belong to the later phase of the civilisation, and building in tiers is a borrowing from Crete, where it was a normal practice. Cretan roofs were flat, or nearly so, hence houses could be conjoined, where necessary, as in towns, and light and air admitted by courts, large and small, and by shaft-like " light-wells ", or " areas ". The complexities of the Knossos and Phaestos palaces arise from the freedom which the flat roof allowed in drawing buildings together. Individual Cretan houses in town and country commonly had three floors and a covered stair leading to the roofs, which were used as terraces. The lowest tier had stone walls and largely was used for storage and household crafts, whilst the upper two were the residential floors; just as was the case thirty centuries later, in Mediaeval and Renaissance Italy. Above the ground floor all the structure was timber-framed, with sundried brick panels between, plastered and gaily painted on the outside with patterns imitating the underlying wooden framework and the log ends supporting the lime-concrete floors. Windows were casements, divided into large panes by vertical mullions and horizontal transomes. The houses would have appeared to our eyes as up-to-the-minute modern, remarkably like the most advanced of our own day. Yet it was the mainland megaron house which proved to have the greater historical continuity; and we must not fail to note another embryo there, repeatedly encountered in Greek architecture later—the *propylaeum*, comprising a pair of back to back porches, usually columned, used as a gateway to mainland palace courts. The famous Propylaea (the plural is used where there are two or more doorways in the dividing wall) at Athens is a descendant in type, paralleled countless times in the approaches to other classical sacred enclosures.

The colossal defensive walls which surrounded the mainland citadels, from twenty-five to fifty feet thick, were constructed of enormous stones, great boulders fitted together with the help of smaller stones and clay mortar. This type of masonry is known as Cyclopean, for tradition ascribed its origin to Cyclopes. At Tiryns, the finest and most representative example, the plan of the fortress is long and irregular, crowning a low hill (16). It was divided into three areas, at slightly different levels; a lower, which was bare, apart from granaries, and served as a place of refuge in times of stress for the peoples of the agricultural, dependant villages; an intermediate terrace for the houses of retainers; and a topmost terrace where was the palace of the chieftain, arranged around two large colonnaded courts. A trio of megaron buildings, of descending sizes and surrounded by tortuous passages and

lesser structures, adjoined the inner palace court; and there were at least two propylaea in the plan, one to each court. Mycenae was similarly walled, and the main gate there—the famous Lion Gate (19)—is the best preserved of all Aegean monuments, despite long centuries of exposure to the elements. Two upright giant stones form the jambs of the portal, and support a massive lintel, weighing some twenty-five tons. Above the lintel is a triangular-shaped false arch, infilled with a heraldic sculptured slab of religious character, portraying



17. PLAN AND SECTIONS OF THE "TREASURY OF ATREUS" AT MYCENAE

a pair of lions *rampant* facing a single column, this tapering downwards in the way customary with the Aegeans.

On several mainland sites there are tombs of a peculiar type. Some are rock-cut, cubiform rooms, with a smaller apartment opening from one flank, approached by a long, open-air, walled passage or "dromos". The passage was needed to allow convenience of approach, for the tombs were cut in the rock below the surface of shallowly-sloping hillsides. Others of the tombs, more mature in workmanship, were wholly artificial, the chambers built up of rings of stone on the false-arch principle, into a pointed dome of a shape resembling an old-fashioned, straw bee-hive. Like the earlier of the type, they were sunk into a hillside, and had the long dromos approach, with finely-cut,

18. THE "ARCHAIC," 6TH CENTURY, B.C., TEMPLE OF ARTEMIS AT EPHESUS (*restored*)

19. THE LION GATE, MYCENAE

20. THE TEMPLE OF POSEIDON AT PAESTUM, SHOWING THE SUPERPOSED INTERIOR COLONNADES

21. THE PARTHENON, ATHENS, FROM THE EAST

sheer retaining walls on either side, as well, usually, as the secondary chamber. The largest, most perfect and celebrated of these tholos (circularly-planned) tombs is that popularly known as the " Tomb of Agamemnon " or " Treasury of Atreus ", at Mycenae (17), which has an inner diameter of 48 feet and a height of 45. It was marvellously decorated inside, for there were three bronze friezes ornamenting the walls, and the stones elsewhere were studded with bronze rosettes. The domed room formed a vestibule to the lesser, rectangular tomb chamber, 27 feet square and 19 feet high, which, to judge by parallel instances, was lined and ceiled with great, heavy, coloured-marble slabs, carven all over with shallow patterns. The stones forming the dome—as in the Lion Gate and other openings in the old walls of the acropolis—are not built in the radiating form of a true arch, but are laid in a series of horizontal, mortarless courses, so that each course overhangs the one below it; the space is thus gradually narrowed until the projecting courses meet at the top—an arrangement similar to the roofs over the galleries in the Pyramids. Immense blocks of stone are used in the structure; the lintel over the main entrance doorway is a single block over 29 feet long and 16 feet deep, weighing more than 100 tons. The chief architectural feature of the building was the entrance doorway flanked by shafts entirely covered with elaborate zig-zag ornamentation. The largest portions of these shafts, after having been lost, were re-discovered and are now set up in a restored form in the British Museum.

Greek Architecture

In the dark centuries which lay between the Aegean and Greek phases, complicated movements of the Eastern Mediterranean peoples took place. The successive invasions into Greece from the north in Aegean times left oases of the several Greek tribes, loosely secured, latterly, under Achaean domination. Even the Doric invasion, about 1100 B.C. did not altogether dislodge the earlier settlers, for some found refuge in Attica or in fastnesses elsewhere. Most, however, fled overseas to other coasts, the majority to the neighbouring seaboard of Asia Minor, where henceforward they are to be known as Ionians. But the Dorians, at first uncouth and uncultured, had not the arts of peace and, ere long, found themselves in want. In their turn they sought new fields and sailed abroad in the wake of their foes. Soon, their settlements predominated in southern Italy, where they ousted or subdued the native tribes and renewed their battles with Aegean

immigrants who had preceded them. Afterwards, in the later eighth century, their occupation of Sicily began. In such wise the Greece of classical times was founded, the tribes intermingled and, to begin with, jealously partisan, but increasingly merging their culture and characteristics as the centuries passed. Dorians predominated in the colonial west (South Italy and Sicily) and on the Greek mainland too, except in Ionian Attica; the Ionians in the Asia Minor settlements. The Hellenes were never truly united as a people, but formed a series of states, which developed a great civilisation; and it was the art they evolved—their " Classical architecture "—which has been the parent of almost all the styles throughout Europe in succeeding ages.

There was another colonising movement too, in these years, which was to play its tremendous part in western history, the architectural manifestations of which we shall see in the next chapter. Whilst the Greeks were establishing themselves in southern Italy, other settlers were landing north of them—the Etruscans, a tribe of oriental associations, displaced from the hinterland or coasts of Asia Minor by famine, if tradition is to be believed. They were every whit as important to the future might and power of the Roman stock as the Aegeans to the culture and refinement of the classical Greeks.

The period during which Greek Classical architecture flourished was a comparatively short one, for the date of the oldest building of which any considerable fragments remain—the Temple of Hera (The Heraeum) at Olympia—is as late as 640 B.C. For two centuries after this, art progressed until, after the defeat of the Persians, it reaches its culmination at Athens during the great Periclean age (460–400 B.C.). A period of reaction then ensued, followed by a short-lived but splendid revival under Alexander the Great, and, on his death (323 B.C.), by a decline from which it never recovered.

The architectural phase which followed Alexander's time—called the *Hellenistic* period, since it was imitative of the *Hellenic* or true Classical style rather than part and parcel of it—though degenerate, has importance in that its extravagances had their effect upon Roman architecture as the Greek lands fell successively into their hands. The Romans lacked the artistic tastes of the Greeks, yet had a profound admiration for their works. They borrowed from them, as we shall see, but were incapable of discriminating between the purity of the classical style and its unworthy aftermath, and introduced into their own architecture therefore, many practices which were artistically unsound, believing that all Greek art was equally good. After Roman

occupation, the native Greek architecture took on an increasingly Roman complexion, and as the responsibility was conjoint, it is known as *Graeco-Roman.* It is not possible to generalise a date for the change from Hellenistic to Graeco-Roman practice, as the transition point varied according to the date of assimilation into the Roman domains. We are here concerned only with the true Hellenic or Classical phase—i.e. up to 323 B.C.

The buildings throughout the Classical period upon which the ancient Greeks lavished their genius were the temples. These differed from the temples of the old Egyptians in almost all points save one—the frequent use of the column as the dominant feature of the design. But the Egyptians built their temples with a view to impress the worshipper by the mystery, the richness, and the grandeur of the interior; for this reason, and for constructive purposes, the columns were placed *inside* the building. With the Greeks, on the other hand, the temples were comparatively small; they were not built as vast memorials of the greatness of despotic monarchs, nor were they required for the accommodation of crowds of worshippers. The roofs had not the massive solidity of the Egyptian structures, and few supports were necessary; moreover, the buildings were designed for external effect. In the Greek temples, therefore, the principal columns were ranged on the *outside.*

As a rule, the building occupied a conspicuous position, that it might be visible from all points and be admired by all. The Greeks' form of worship was not congregational; it consisted chiefly in prayers offered up outside the sanctuary—from any point within view of the temple—to the deity whose image was enshrined in it. To provide shelter for this image was, in fact, the chief purpose of the temple. Thus the plan was invariably simple. In the smaller buildings, four walls formed an oblong chamber, the *naos*, in which was placed the statue of the deity. A portico with columns, the *pronaos*, gave access to this chamber; and there was a duplicate rear porch or *opisthodomus.* The whole stood upon a shallow platform of several steps, and was covered by a simple roof terminating in a gable at each end. In the majority of temples, as we shall see later in the Parthenon, columns were ranged all round, forming a *peristyle*, and at the back of the sacred cell a second chamber was sometimes added, to serve as a treasury in which to deposit the votive offerings. Stone, frequently marble, was the material used in the construction throughout, except in the roofs, which were of wood covered with terra-cotta or marble tiles. The perishable roofs

have all disappeared, and with them has been lost almost all evidence regarding the method adopted by the Greeks for the lighting of the temples; for the walls of all known buildings of this kind were windowless. The question of the lighting of the Greek temple has given rise to much speculation, but it seems probable that in the normal case, the door was the only source. Doors were very high proportionately, and when open would admit all the light needed; a " dim, mysterious " gloom would not be out of place to lend awe to the image of the deity within the naos. The daylight there is clean and strong, not misty or diffused like ours in England. In recent times we have learnt of one means by which natural light was admitted, though not necessarily to the naos. On certain sites there have been found fragments of very large marble or stone tiles, within which there were quite sizeable openings. These would serve to illuminate the space between the flat wooden ceilings commonly used and the sloping roofs, and some of the light might have been transmitted to the naos below by the formation of corresponding openings in the ceilings. Marble, where used for the tiles, being translucent, would serve similarly, but in very modified degree. It was at one time thought that the Greeks must have left large hypaethral openings in the roof, but no evidence is forthcoming; though one or two very large temples were left unroofed because the Greeks were incapable of solving the structural problems involved.

However much we admire Grecian architecture for its artistic delights, we recognise that they had little aptitude for or interest in structural experiment. Their temples differed little in type from first to last and were always elementally simple. They never learnt—in the Classical period at least—how to organise the wooden members of a roof so that they locked together into a " principal " or " truss ", devouring its own stresses, and consequently were only able to make small buildings, except by introducing internal props, in the shape of stone columns, to support the roof timbers direct. The latter they did quite often; and to avoid undue encumbrance of the naos space, they frequently used a most clumsy device—one row of columns standing upon another—as at the Temple of Poseidon, Paestum (20). This was no question of aesthetic choice, but a structural necessity; their builders had no other recourse. Greek stone and marble construction is laborious, painstaking and meticulously exact, but it is infinitely less clever than the Roman constructional system.

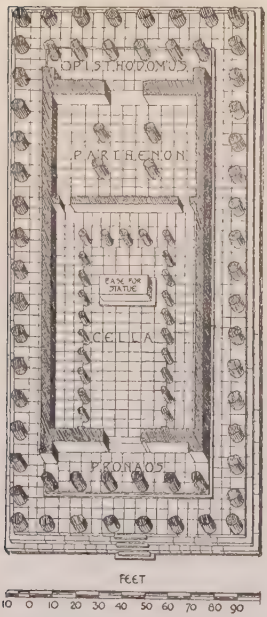
Reference has already been made to the " Doric order " of Greek architecture, and throughout this story we shall constantly have to

refer to the " Classical orders ". The term requires a few words of explanation.

To the casual observer, Greek temples would all bear a striking resemblance to one another; yet among the designs there existed three more or less distinct styles. Each style was marked by the use of its peculiar form of column, and, accompanying this, was a series of mouldings and proportions normally found only in conjunction with that column. Among the Greeks the " three orders " were called the Doric, the Ionic and the Corinthian. The Doric Order was, of course, that evolved by the Dorians and, to begin with, used exclusively by them. Similarly, the Ionians evolved their own version in their own lands. These two alone are the direct expressions of structural systems; the Corinthian was an artificial and whimsical invention, a more ornate variation of the Ionic originating in the culminating period. Initially, little but the capital differed from the Ionic, but after a time the Corinthian order was supplied with distinctive parts by a reorganisation of certain of the Ionic mouldings; but even so, it was left to the Romans to give it full individuality. With the Romans, who adopted and remodelled the orders for their own ends, it became the most popular as well as the most beautiful of the orders. To a small extent the original Doric and Ionic orders reacted upon one another and occasioned variations, but in essentials they retained their purity throughout classical Greek times and admirably typified the differing characteristics of the two main branches of the Greek race. The Doric was marked by simplicity, strength and severity, rendolent of the hardy, stern tribe who gave it birth; the Ionic was more graceful and ornate, significant of a people living a richer, more luxurious life and indicative of contacts with the pleasure-loving and leisurely east.

The earliest example of the Doric order of note is the Heraeum at Olympia (*cir.* 640 B.C.). Its remains are most illuminating, for they illustrate the first stages of transition from an earlier wooden architecture to a counterpart in stone. This and other sites prove beyond doubt that almost every essential feature of the developed stone or marble Greek temple is a replica of a timber prototype, and for this reason Greek architecture sometimes has been called a " carpentry in marble ". Indeed, the Heraeum was itself originally of timber. When Pausanias, the Roman traveller, visited the place in the second century A.D., one wooden column still survived, but the remainder, then outworn, had been replaced in stone. We can see the latter now, in part, obviously belonging to restorations of various dates, since there are

two or three different masonry techniques. The naos upper walls were timber-framed, infilled with sundried brick and stuccoed over, standing on a dado of beautifully cut stone, which still survives. The antae and the door frames were of upright timber baulks, and the resemblance throughout to the megaron of the Aegeans was very close, except for the addition of the now normal outer peristyle of columns and two inner lines of columns, within the naos, each alternate one among the latter being attached by a short spur wall to the main naos walls. Undoubtedly, the entablature and the roof were of wood, the latter covered by terra-cotta tiles.



22. RELIEF PLAN OF THE PARTHENON, ATHENS

For an early temple wholly constructed of stone—apart from the roof—we turn to the temple of Apollo at Syracuse, (*cir.* 575 B.C.)

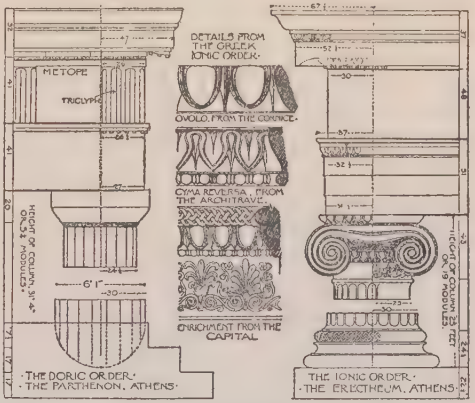
Here the strikingly obvious point is that the Greek masons were still inexpert and decidedly mistrustful of the bearing powers of stone, for the columns were squat and clumsy in the extreme and carried a ponderous load of crudely proportioned entablature. The columns were scarcely four times their own diameter in height and stood so close that their widely projecting capitals nearly touched. Later examples show a notable improvement in proportion and workmanship. In the well-preserved temple of Poseidon at Paestum (*cir.* 460 B.C.) the columns are remarkably less stumpy and massive and the entablature is duly lightened (20). The tendency to the lightening of proportions is consistent and continues long beyond the period of the culmination; ultimately, in the final stages of decline of Greek art, the Doric column becomes almost absurdly slender.

It was not until after the Persian wars that the noblest architecture of Greece was developed, when the Athenians gave vent to their enthusiasm, after the invaders had been defeated, by the rebuilding of the national monuments.

Under the wise rule of Pericles (444–429 B.C.), a glorious period of activity ensued, when architecture in Greece culminated, and the

unrivalled group of national buildings sprang up on the Acropolis at Athens. Foremost among these was the Doric temple of the virgin goddess Athene, the world-renowned Parthenon (Gr. *parthenos*, a virgin), a building which, for beauty of design and for delicacy of workmanship, must be regarded as the nearest approach to perfection of all works ever erected by man (21).

The Parthenon (447–438 B.C.) reveals to us all the leading features of a fully developed Doric temple. The plan (22) was simple and regular, consisting of two cells—the sacred chamber and another smaller chamber, the Parthenon proper, behind it. Round these was ranged a peristyle, or series of columns, eight of which formed a portico at each end; each portico contained an inner row of six columns. The whole structure stood upon a " stylobate ", or raised pavement, three steps in height.



23. COMPARATIVE DIAGRAM OF THE GREEK DORIC AND IONIC ORDERS

In conjunction with this plan, let us consider the features which constitute a design of the Doric order (23). The column of this order, as the illustration shows, has no base, but is set directly upon the stone floor or platform; its diameter is greatest at the foot, and from this point it tapers towards the top not in a straight line, but with a subtle convex curve, or swelling, called the " entasis ". Around the shaft are flutes, or shallow channels, usually twenty in number, with a sharp edge between them. Surmounting the shaft is a plain, sturdy capital, made up of a square slab, or " abacus ", upon which the superstructure rests, with a circular cushion called the " echinus ", spreading out from the top of the shaft to receive the weight from the abacus. The grooves on the face of the column are carried up until they are checked by a band of fillets just below the capital.

The upper portion of the design, supported by the columns, is called the entablature. This consists, first of a horizontal marble beam, or

" architrave ", upon which the weight rests, and by which it is distributed to the columns. Being the *supporting* member of the entablature, the architrave was almost invariably left plain, lest ornamentation of its surface should detract from its appearance of strength. Above the architrave runs the frieze, which, in the Doric order, was divided into square panels, or " metopes ", separated by slightly projecting blocks, called " triglyphs " (three channels), on the face of which are cut vertical grooves. As will be seen from the sketch, a triglyph occurs over each column, and one between each pair of columns. In many cases the metopes were filled in with sculpture in relief. The remaining portion of the entablature, above the frieze, is the " cornice ".

We see, then, that the leading features of the order are the column and its entablature, the latter consisting of three parts—the plain architrave, the frieze, with its metopes and triglyphs, and the cornice. On the underside of the cornice will be noticed a series of marble slabs (mutules), each having a number of small projections resembling wooden pins, or nail heads.

At the ends of the building the upper members of the cornice are made to follow the lines of the sloping roof until they meet in the centre at the top, while the lower portion is carried along horizontally above the frieze. The triangular space thus formed is called the pediment; and, as the most prominent part of the design, contained the finest of the sculpture with which the temples were frequently adorned.

The main details of the Doric order were, as we have seen, derived from early forms of construction in timber. The architrave represents the beam which would be found in a similar position in a wooden building; the triglyphs correspond to the ends of cross-beams grooved for decorative effect; and there seems little reason to doubt that the mutules are reminiscences of the sloping ends of rafters studded with nails. The column too, it is perfectly clear, derives from a timber prototype, but whether the Greeks drew inspiration for it from the Egyptian—we have seen that the tombs of Beni-Hasan and certain temples in the Nile valley had pillars of superficially similar form—or invented it anew, must remain an open question.

We have mentioned the Parthenon as the noblest example of a temple of the Doric order. Careful measurements of this building have revealed the existence of a number of refinements in its construction—with a view to the correction of optical illusions—which help us to appreciate the extraordinary thought and care which the Greeks bestowed on their designs. The best known of these refine-

ments is the " entasis ", or swelling of the outlines of the columns. The bounding lines of the shaft, which appear straight, are in reality convex—curved outwards from the straight line—to the extent only of three-quarters of an inch in a height of more than 31 feet. This curve is not noticeable to the eye, but is just sufficient to counteract the tendency which exists in a straight-sided column to look hollow in the middle.

Again, the underside of the architrave appears to be perfectly straight. Now a long, horizontal line, which is perfectly straight, tends to look as though it " sags " or droops in the centre. To compensate for this, the horizontal lines of the entablature are all slightly curved upwards towards the centre, deviating from a straight line to the extent of about 3 inches. The lines of the steps are curved in a similar way.

Another subtle correction is applied to the vertical lines, to counteract the apparent tendency of the building to spread outwards at the top. The columns are not truly vertical, but are set with an inclination, so that they all converge slightly towards the top. The slope could not be detected by the eye; but it was considered that, by affecting the beholder insensibly, it helped to give the building the appearance of repose and of solidity. So slight is the inclination that columns at opposite ends of the temple deviate from the vertical to the extent of about $2\frac{1}{2}$ inches; so that their axes, if produced, would meet at a point more than a mile above the ground !

The Parthenon is built of Pentelic marble from the neighbouring quarries. All the marble blocks were laid without mortar, and were worked—probably ground together—so carefully that the joints were only visible by occasional differences of colour. The columns were built up of cylindrical " drums ", which were first rough-hewn, and then finished and fluted after they had been fixed in position.

Of the sculptures which adorned this wonderful building, many fine examples are now in the British Museum, where they form the chief portion of the collection known as the Elgin marbles. When Lord Elgin was ambassador to Turkey, in 1800, Athens was in the hands of the Turks, who were busily engaged in dilapidating the buildings on the Acropolis, in order to dispose of fragments to travellers. Seeing that the works of art were receiving daily injury, Lord Elgin was induced to consent to the removal of whole pieces of sculpture, which were thus saved from destruction, and eventually found a resting-place in our national museum.

The bas-reliefs in the metopes of the frieze—executed with remarkable vigour—represented the battle of the Centaurs and the Lapithae; many of these, as well as the colossal groups of statuary which filled the pediments, were doubtless the work of Pheidias himself. Among the pediment sculptures is a noble statue of Theseus reclining. "I should say," said one of our most eminent sculptors, when giving evidence before a Committee of the House of Commons, "that the back of the Theseus was the finest thing in the world." In connection with this remark, let us remember that the statue was executed for a position some 50 or 60 feet above the eye, so that it could not be examined closely by any spectator. Moreover, the back of the statue was turned towards the wall of the building and away from the spectator; it could not, therefore, be seen by any one. This example serves to illustrate the surpassing excellence and the thoroughness which marked the work of the Greeks at their best period. Truly:

> In the elder days of art
> Builders wrought with greatest care
> Each minute and unseen part—

for we find in the Parthenon that all the work which was invisible to the spectator was as carefully and as religiously finished as that which was immediately in sight !

Colour decoration was an essential part of the Doric temple design. The Parthenon, at the time of Pericles, did not present a front of dazzling white marble, for the entire building, on the exterior as well as on the internal walls, was richly decorated with colour. The frieze, with its metopes and triglyphs, was brilliant with blue and red, the glare of the walls and columns was toned down to a pale yellow tint, and the mouldings and capitals were decorated with frets, egg and dart, and other ornaments in dark colours, so that the whole design presented an appearance of richness and gaiety, rather than of simple dignity.

Ictinus and Callicrates were the architects of this wonderful building, and to their genius was added that of the great sculptor Pheidias. The temple was in reality a stately shrine for the colossal statue of Athene, 40 feet high, of ivory and gold, the work of this artist. Much of the sculpture was also probably from his hand.

Remains of many Doric temples are to be found in different parts of Greece and of her colonies. Among these the most important are the Theseum—the best preserved of all Greek temples, in a sheltered spot below the Acropolis—the temples at Selinus and Agrigentum in Sicily, and at Paestum in Magna Graecia (South Italy), the temple of Zeus at

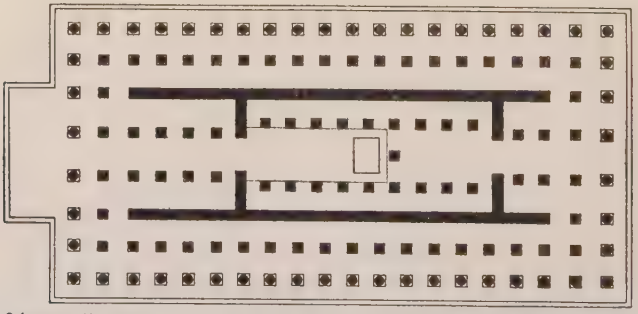
Olympia, and at Segesta in Sicily, and that of Apollo Epicurius at Bassae in Arcadia.

The Ionic order (23), which the Ionians in Asia Minor developed independently as their version of the current Greek architecture—it should be clearly understood that the Doric and Ionic are concurrent and not consecutive evolutions—resembled the Doric in general form but differed materially in its particulars. Details of the early history are far from clear, but there is every likelihood of a similar wooden origin, from the evidence of the architecture itself as well as from other indications. The earliest temples were simple rectangles, usually with a deep front porch, though none in the rear; there were internal columns and some in the porch to correspond. Outer peristyles appeared quite soon, and once these became common, they were even more important than in the Doric temples, for there was often a double line, completely encircling the naos (24). This *dipteral* arrangement as it is called, is as characteristic of Ionic practice as is the *peripteral* or single line circuit used by the Dorians.

Ionic columns always were very much more slender than the Doric, and the capitals were almost entirely different. The initial inspiration for them appears to have been drawn, at second hand, from the Egyptian lily cap, via Asiatic channels. Early examples found at Larissa and Neandria have pairs of large upstanding scrolls or *volutes*, with minor ornament and a conventionalised hanging girdle of leaves below. No doubt, all the upper parts of the temple were then of wood, for the column shafts were exceedingly slender, and probably therefore, entirely without flutes. In course of time, the volutes of the capitals were joined together to form a continuous band, shaped like an inverted, partly-opened scroll of parchment, resting upon a circular echinus cushion, scarcely recognisable as the pendant girdle of foliage from which it had originated. Column shafts became rather less slender, and flutes then were almost invariably used.

At Ephesus, a very famous Asia Minor site, there was a temple to Artemis—" Diana of the Ephesians "—erected at this particular stage of the progression (560–546 B.C.). It was burnt down in 356 B.C., and rebuilt on the same spot, so the remains are not extensive and there are some uncertainties about the exact form of its plan. To distinguish the two buildings, the one is known as the *Archaic* and the other the *Later* temple of Artemis. The Archaic temple was grand in size, 360 feet by 180 feet over the platform, and comprised a single naos, a deep front porch and another much shallower one at the rear, and had

a surrounding double line of columns. In all, including those in the porches and in the interior, there are said to have been 127. It stood within a rectangular *temenos* or sacred enclosure, bounded by colonnades. In its ostentatious magnificence, lavish variety of sculptural detail and character of plan, the temple was typically Ionian. Though all the columns were alike in general form, they differed considerably in detail as regards base, capital and shaft, and thirty-six among them, occupying important positions at the east and west ends, were unique to this site in having sculptures around the lower part of the shafts. Inscriptions tell that some of the latter columns were erected at the



24. THE " ARCHAIC ", 6TH CENTURY, TEMPLE OF ARTEMIS, EPHESUS

expense of the almost legendary Croesus, at that time monarch of Lydia. The shafts regularly were fluted, the number varying between forty and forty-eight, meeting at a sharp angle; and similarly, there was a variety in the carving of the capitals, the scrolls of which spread widely beyond the line of the columns and supported shallow, moulded abaci, much longer in the line of the entablature than in depth from front to back. Bracket-shaped capitals like these were usual in the early stone temples, but later, the echinus was reduced to a square, on plan, and the volutes were gathered more closely about the shaft of the column (18).

The Later Temple at Ephesus (after 356 B.C.) carries our tale of Ionic development beyond the peak of the Greek culmination, but we may note it here, as it serves to confirm the characteristics of the Ionic order on its native soil; for, as we shall see, ancient practices were retained there long after the Athenians, kindred to the Ionians in tribal origin and favoured by fortunate circumstances of history and geography, had transformed the order into that which we regard as its perfected form.

The Later Temple much resembled the old. After the fire, the remnants were demolished and used to form a new platform, in two flights of steps. The plan was repeated almost exactly, and again there was the special feature of the sculptured embellishment of the lower portion of some of the columns, one of them by a renowned sculptor named Scopas. The beauty and richness of this second temple were such that it was included by the proud Greeks among the seven wonders of the world.

Little has been said, so far, about the Ionic entablature, for the reason that the evidences surviving are not very great, but one matter is perfectly clear—the entablature had originally only two main parts, not three, like the Doric. There was an architrave, representing what at the outset had been three wooden plates, laid one above the other, and a cornice, in which there occurred importantly, a series of large, tooth-like projections or *dentils*, which once had been timber rafter-ends. There were other cornice elements too, including an upper gutter moulding or *cymatium*, which in Ionic temples circulated the entire building, rising up the inclined sides of the pediment at the ends; on the flanks there were carven lions' heads at intervals, serving to throw off the rainwater from the roof through their gaping mouths. In Doric temples, a moulding of this type occurred only above the pediments and for a short distance along the adjacent sides of the building; for the rest its place was taken by the decorated cover-tiles, called *antefixae*.

A frieze, then, is not normal to the entablature of the original Ionic order; even in the late fourth century B.C., the older form was still employed in Asia Minor, though the developed type—with its frieze—by that time had long been in use on the mainland of Greece. The very finest instances are indeed in Athens or in its neighbourhood. Attica, as we saw earlier, was a refuge of the ancient Aegeans, when driven before the Dorian onslaught, and though Doric influences ultimately permeated the state, the Ionian affinity still survived. Athens was a fit meeting place for the Hellenic styles of east and west, and it is there that we find Greece's most superb architecture; the sternness of the Doric softened a little by Ionic grace and the florid exuberance of the Ionic curbed by Dorian austerity. The sharp individuality of the styles too, began to disappear, for though the Athenian architects preserved the narrower identity of the separate orders, they did not hesitate to use them together in the one building. There are four Ionic columns in the inner Parthenon and others inside the seemingly

Doric Propylaea; and we have mentioned one instance as Doric which in fact embodies three styles, Doric, Ionic and the newly invented Corinthian, the temple of Apollo Epicurius at Bassae, designed by Ictinus, one of the architects of the Parthenon. There are other instances of the versatility of this able architect, who not only rang the changes on the two authentic orders but invented new variants for them.

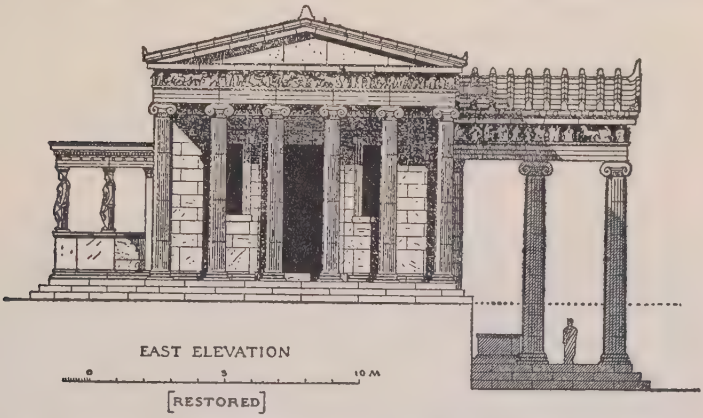
Amplifying our description now to apply to the perfected Ionic order of the culmination in Athens (23), we note that it corresponded with the Doric in all essential particulars but was much more slender—from eight to ten diameters in height. The rich volutes of the capital close-clasped the cushion-shaped echinus, and there was a shallow abacus above, essentially square, but of which the four sides were slightly hollowed so to bring the angles to a sharp—or sometimes, a blunted—point. The capital was not four sided; the front differed from the side, and at the angle of a colonnade the difficulty of expressing the neighbouring full faces was somewhat clumsily overcome by curving them outwards at a 45° line on plan (25). The column did not spring directly from the pavement like the Doric, but had a horizontally moulded base, made up of an alternation of concave and convex elements of varying sizes. Column shafts were fluted, the regular number being twenty-four, and now they are separated one from another by fillets, rather than meeting on a sharp edge, as formerly, and as they in the Doric still did. In the entablature the original plate-like *fascias* survived, crowned by a small composite mould, and there was then the newly acquired frieze, devoid of architectural elements like the Doric triglyphs, but often decorated with a low-relief sculpture. In the earliest instances in which the frieze appears, as in the case of the two prime examples on the Athenian acropolis, the Erechtheum and the temple of Nikè Apteros, the lower part of the Asiatic type of cornice was omitted, together with the typical dentils; but these were restored again in the later instances. The crowning member of the cornice, the cymatium, was often enriched by carving as well as sculptured lions' heads.

25. IONIC CAPITAL FROM THE ERECHTHEUM, SHOWING THE CANTED VOLUTES AS USED AT THE OUTER ANGLES OF BUILDINGS

The finest and most notable example of the developed style is the

Erechtheum on the Acropolis at Athens (26). This building shows much variety of detail of the most refined kind, and—an unusual feature in the temple designs of the Greeks—considerable irregularity of plan. This is due partly to the difference of levels, rendered necessary by the uneven site; but it is chiefly accounted for by the fact that in the one design were included shrines of several deities—Athena, Pandrosus and Erechtheus.

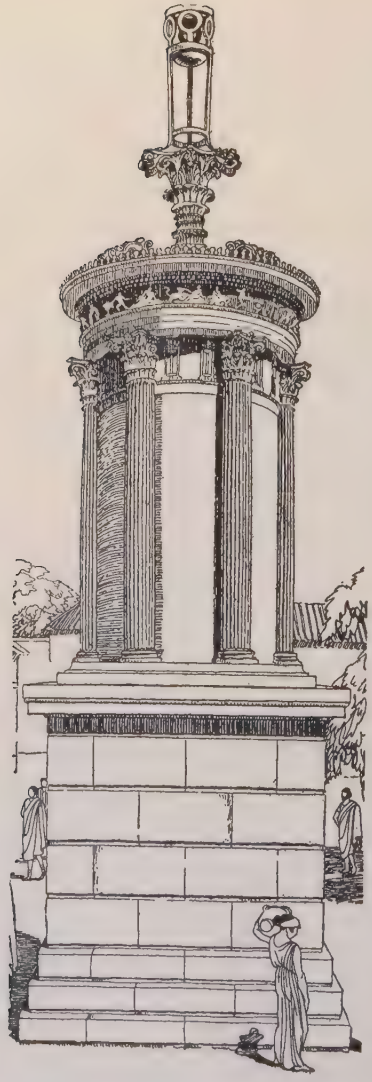
The Erechtheum was begun in 421 B.C., but there was an interval, and building was resumed about 409 B.C. It twice suffered from fire



26. EAST FRONT OF THE ERECHTHEUM. THE TWO PORCHES FLANK THE WEST END OF THE TEMPLE

in the historical period and was repaired and, in some particulars altered, in Roman times. A feature of the design is the little south porch, the entablature of which is supported by female figures (caryatids) in the place of columns. One of the caryatids and some examples of the carved ornament, borrowed from the Asiatic honeysuckle, may be seen among the other treasures of ancient Greece in the British Museum.

The temple of Apollo Epicurius, at Bassae, in Arcadia, *cir.* 430 B.C., referred to earlier, contains the first known instance, a solitary column, of the Corinthian order. According to tradition the Corinthian capital was invented by a bronze worker named Callimachus, of Corinth, and certainly in some of the earliest stone and marble designs there is more than a hint that the acanthus foliage—which is the essence of the type—was directly imitated from bronze originals. The part underlying the acanthus foliage resembles an inverted bell, and is



27. THE MONUMENT OF LYSICRATES, ATHENS

known by this term. The *bell* carries a slender abacus, shaped like its Ionic counterpart, and voluted tendrils of the acanthus sweep outwards to support the four angles. As the capital was of identical design on all four faces, it was more convenient to use than the Ionic and even more richly decorative in effect. Some most beautiful examples are found in circular temples at Epidaurus, Delphi, and Olympia, but so far as is known, there was nothing distinctive about their entablatures, which continued to resemble the Ionic closely. In each of these *tholoi*, the order was internal, the outer style being Doric or Ionic; the first instance of the use of the order outdoors, was in a monument at Athens (27), a most graceful structure erected by Lysicrates in 334 B.C., in commemoration of his victory in the choral competitions. The monument has two tiers, the lower cubiform and the upper cylindrical and decorated by six columns, partly embedded in the walls. The roof was a single block of marble, carved in imitation of "fish-scale" tiles and carrying an acanthus-floriated terminal and a bronze tripod The entablature closely follows the Asiatic type, with large scale dentils in the cornice, but includes the frieze made customary by the Athenian examples of the order.

28. UPPER PART OF THE PORTA MARZIA, PERUGIA

29. CERVETERI. ETRUSCAN ROCK-CUT "TOMB OF THE STUCCOES"

FRONT ELEVATION
TEMPLE OF LO SCASATO CIVITACASTELLANA
A SCHEME FOR RESTORATION · FROM THE FRAGMENTS ·
IN THE VILLA DI PAPA GIULIO III ROME · AFTER THE MANNER OF ·
· VITRUVIUS ·
THE PLAN
THE ELEVATIONS
PLAN
SCALE OF METRES

30. ETRUSCAN, THREE CELLED TEMPLE AT LO SCASATO, CIVITA CASTELLANA

Restoration by H. Chalton Bradshaw

The Greeks came no nearer than this to the evolution of a distinctive entablature; it was left to the Romans to bring the Corinthian order to its ultimate fruition.

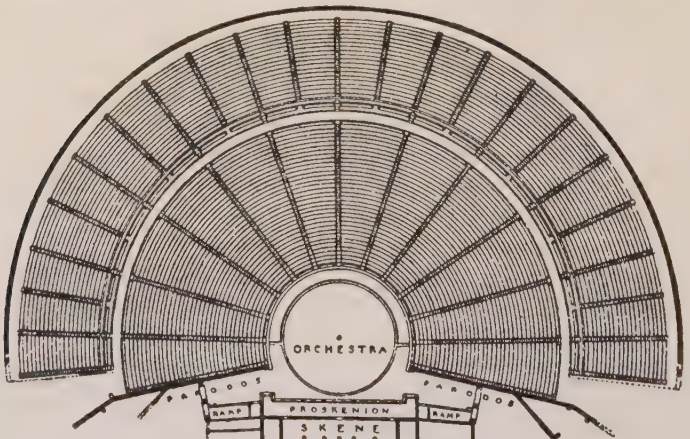
Although the Alexandrian age was an era of great magnificence, it was, in reality, a decadent period so far as art was concerned; and after the death of Alexander (323 B.C.) architecture never recovered its lost ground. It must be remembered that Greek architecture ceased to be representative after the country had come under the influence of conquering Rome, unsympathetic to the Greek artistic ideals and centred on the more material objective of serving the needs of a great and expanding domain. Among the vast undertakings of the Hellenistic and Graeco-Roman period was the temple of the Olympian Zeus at Athens, a magnificent building of the Corinthian order, begun about 170 B.C., but not completed until 300 years later. When Sulla entered Athens with his army, he carried off several of the capitals and other portions of the temple to Rome, where they probably served the Romans as models of the Corinthian order.

Before leaving Greece, mention must be made of some buildings of which remains exist, other than temples. The largest structures were the theatres for dramatic representations, which were built frequently in an excavation of the sloping hillside, in the form shown. In the centre was an altar to Dionysus, the space around—the orchestra—being occupied by the chorus; the actors appeared on a small stage, while the audience occupied stone or marble seats, ranged in ascending tiers. In the theatre of Dionysus at Athens accommodation was provided for about 30,000 spectators.

More beautiful and better preserved was the theatre at Epidaurus (*cir.* 330 B.C.) which may be taken as the representative Greek example (31), in contrast with the Roman type which developed from it. Because of the fall of the ground, the Greek auditorium was horseshoe in shape and was separated by a space from the scene building, which at first served merely as a background to the action taking place in the orchestra. The principal element of the scene-building was a columned portico, and in due course it became customary to use the roof of this for dialogue purporting to come from high places. Ramps were provided for access, as at Epidaurus, where this narrow, early platform was eleven or twelve feet high. As time progressed, action increasingly passed to the platform, which became ever lower and wider, encroaching on the former full circle of the orchestra; whilst behind this stage a permanent architectural scenic background developed, of increasingly

profuse and fantastic ornamental shape. By full Roman times, auditorium, orchestra and scene building were welded together to form a whole, and, as the Romans became adept constructors, they were able to build the entire structure from the flat ground, without having to resort to an excavated hill-side for a safe foundation.

The Greeks built few important tombs. The most celebrated was the mausoleum at Halicarnassos, in Caria—another of the seven wonders of the world—which received its name from Mausolus, to whose memory it was erected by his wife Artemesia (*cir.* 353 B.C.).

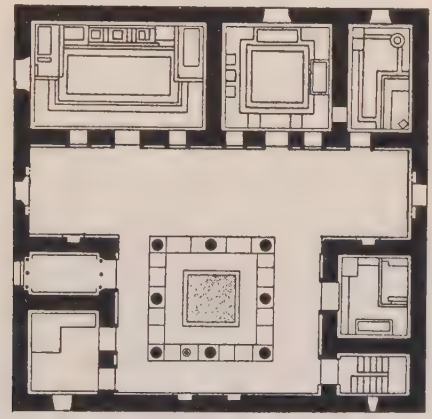


31. PLAN OF THEATRE, EPIDAURUS

This tomb was a splendid structure in the Ionic style, richly decorated with sculpture. Portions of the colossal chariot and horses which surmounted the pyramidal roof may be seen in the "Mausoleum Room" of the British Museum.

Some of the memorial stones (steles) used by the Greeks were beautifully carved, and it is interesting to notice that on many of them are found sculptured representations of the arch. Although the Greek builders were undoubtedly acquainted with the arch, they appear, so far as our knowledge goes, never to have made any practical use of it for their chief buildings. "An arch never sleeps," says the Hindoo proverb; and the Greeks, perhaps rightly, felt that its use would detract from the simplicity and the feeling of repose to which they endeavoured to give expression in their designs.

Our knowledge of the domestic architecture of Greece is slight, for such remains as survive are ill-preserved. Organised town-planning developed from the fifth century B.C. on geometric lines, and towns were laid out in rectangular plots bounded by a " chess board " of straight, narrow roads. Houses commonly were closely built, six or ten to each of the building islands or *insulae*, formed by the intersecting roads. Only their lower parts were of stone, the upper being of sun-dried brick. Some fourth century B.C. houses at Priene, in Asia



32. PLAN OF THE "MAISON DE LA COLLINE", DELOS

Minor, were one-storey high and included among the rooms a principal unit bearing some resemblance to the Aegean megaron. The rooms faced inwards towards an internal court, and not outwards to the street; and the latter arrangement is notable at Delos (32), where the courts were often colonnaded and had a sunken water tank at their centre. The peristyle (colonnaded) court arrangement occurring in the larger houses is a most important feature, for we shall see that it was borrowed by the Romans and made an adjunct to their own type of house, which then came to have two quite clearly distinguishable parts, as is seen in instances at Pompeii and elsewhere. The principal apartments in the better Greek houses were finished with beautiful mosaic floors and richly painted plastered walls.

CHAPTER III

ETRUSCAN AND ROMAN ARCHITECTURE

In dealing with the early days of Rome it is difficult to distinguish between fiction and truth, between legend and history. There was, no doubt, a good deal of human nature in the early inhabitants, which led them—after the city had gained for itself such a position as to secure the respect of all neighbouring nations—to feel that they could not have been fashioned from the same stuff as were other men. We thus find that the early traditions "mixed human things with things divine," and gave a divine origin to the eternal city. Whatever be the true story of the foundation of Rome, it appears certain that at the date assigned to it (753 B.C.) a people called Etruscans were flourishing in a highly civilised state in the immediate neighbourhood.

The Etruscans were a race of foreigners, and although the source from which they sprang is still debated, there is little doubt that they were colonists who had come, by sea, from the Eastern Mediterranean, perhaps from Asia Minor. Like the Normans of later times, they were an adventurous and masterful people. They are thought to have arrived in Italy towards the end of the ninth century B.C., making landings in successive swarms on the coast of what is now the province of Tuscany, progressively penetrating inland and subduing the native population, then living side by side with them in a relationship not unlike that of Norman and Saxon in early post-Conquest England. The parts firmly colonised extended to the crests of the Apennines in the North and East and up to and beyond the river Tiber in the South; but at one time, about 500 B.C., their domains reached across to the Adriatic, northwards to the river Po and southwards down the western seaboard to the Naples region. It is probable that Rome itself was for a period under Etruscan domination. They were tenacious and well armed warriors, yet their clan-like form of political organization splintered irrevocably against the steadfast unity of the Latin league, inspired by Rome.

Rome, rising miraculously from a modest city state, broke the Etruscan power in 396 B.C. in the final clash of a bitter and protracted

struggle with the neighbouring, powerful city of Veii. Thereafter, the subjugation of all the Etruscan loose confederation of city states was merely a matter of time.

Rome inherited the Etruscan civilisation; on Etruscan political, social, religious and military systems its own culture was founded. But for the Etruscan contribution, Rome could not have so excelled in the construction of mighty works of architecture and engineering, and, as we shall see, it is in constructive skill, and not in art as in the case of Greece, that Rome achieves pre-eminence. The Etruscans, like the Romans in their turn, leaned heavily upon the Greeks for artistic inspiration, but in the realm of construction, whether in the methods and principles evolved, or in hydraulic, military or structural engineering, their triumphs owed little to external inspiration.

Already on arrival in Italy, the Etruscans were clever metal workers; in bronze, silver and gold. It was, perhaps, the fact that the island of Elba, off the Tuscan coast, was rich in iron deposits and that the neighbouring mainland was then, though not now, densely timbered to provide fuel for the smelting, that they were first attracted to these coasts. The weapons they made gave them the advantage over the native peoples and it may have been due to the comparative excellence of their tools that they were able soon to develop a fine technique in masoncraft.

The Etruscan monuments which still exist are chiefly defensive city walls and tombs. Most other buildings, including temples, were timber-framed, the framing infilled with sundried brick. These, naturally, have disappeared, apart from occasional foundational traces where the latter were of stone.

Instances of defensive stone walls are numerous. Great lengths still stand at Volterra and there are extensive remains at Perugia, Cortona and elsewhere. Every notable town once was girdled with massive fortifications. The stones nearly always are large; sometimes enormous. They are laid either in regular courses, systematically " bonded " together, or are fitted one to the other in great polygons. In the true polygonal walls the joints are narrow and neat, but there is a rougher variant in which the stones are uncut boulders, this constituting the type known as " Cyclopean ", as seen earlier, at Tiryns. These several differences of technique were determined partly by the nature of the available stone and partly by the purpose and situation of the wall. No mortar was used, whatever the type.

A true form of arch, of wedge-shaped units, is used for the gateways

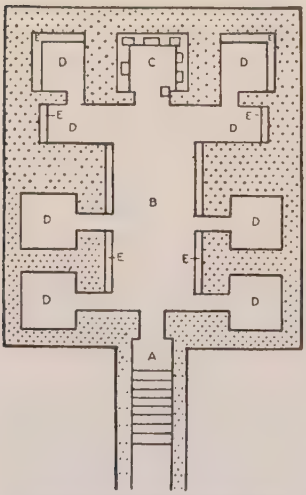
of Etruscan city walls. Here is represented a very important principle, for all, or nearly all, that is vital and characteristic in Roman architectural construction rests upon it. The true arch is age-old; there are instances in Egypt dating from as early as the 4th millenium B.C.; but the material is sundried brick. True arches in stone—these again in Egypt—ante-date the Italian only by a century or two and there is no evidence to show connection. The principle most probably was re-invented. To which people, Etruscan or Roman, the credit is due is not clear, but the point is unimportant since at the outset, their histories were closely interlocked. The first known instance occurs in Rome itself, in some vaults over a drain at the north-west end of the Forum. The vaults date from the end of the sixth or the beginning of the fifth century B.C. At that time, Rome would only recently have emerged from Etruscan domination, which is believed to have extended from 623 to 510 B.C. The earliest true arches above ground, of any real architectural importance, are almost certainly Etruscan. They are those of the city gates of Perugia (28), Volterra and Falerii, ascribed to the fourth and third centuries B.C.

Much that we know about the Etruscans is derived from the rich treasures found in the tombs scattered so abundantly throughout former Etruria, for it was the normal practice among the greater families to bury with the dead the most valued possessions which had surrounded them in life. Weapons of war and the chase, favourite furniture, rich jewellery and adornments, dining and kitchen utensils, were entombed with man or with wife; chariots even, and the harness of the horses which drew them, honoured the passing of the greater chieftains. Etruscan cities mostly were built upon elevated, craggy sites. Burials were made well outside the city walls in tomb chambers cut in the rock face or sunk below the level ground, where the living rock was not too hard to work readily. As the centuries passed, great cemeteries grew, far more durable than the towns themselves. At Cerveteri—the ancient Caere—is a veritable city of the dead, with its own main and subsidiary roadways, lined with tombs, all cut in the soft rock. The tombs mostly are of the seventh and sixth centuries B.C., though burials within them continued until the fourth. There, as elsewhere, are two principal classes of tomb, the tumulus and the "house" types. The tumuli were immense, cone-shaped mounds of earth, up to 150 feet in diameter, resting within low drum-like retaining walls hewn from the upper surface of the rock foundation. Patches of cut stone were used to repair any natural fissures. Within the tumuli

were roomy trench-like chambers, placed radially towards the centre but disposed irregularly around the mound. The graves usually were of different periods within the one tumulus. Sometimes the grave chambers were cut wholly in the rock below the level of the base of the tumulus, approached by a sloping corridor from the perimeter; others had a false vault covering of inward-stepping courses of cut masonry. There are instances, though not at Caere, of " tholos " tomb chambers. These are wholly of cut masonry, also built up of inward-stepping level courses but in this case to create a false domical vault, shaped like the pointed half of an egg. The tumulus tomb has a long history in central Italy and is probably the most representative type of ancient funerary monument there. Towards the end of the train of development come the mighty monuments of two of Rome's greatest emperors; the Mausoleums of Augustus (*cir.* 25 B.C.) and Hadrian (*cir.* A.D. 135). The first of these tombs, about 280 feet in diameter, had a magnificent two-stage cylindrical outer wall, enclosing a terraced funerary garden, rising in receding stages to a statue of Augustus crowning the apex. That of Hadrian was similar, in dimensions as well as arrangement, except that the lower stage was a cubiform " podium ". The latter tomb was converted into the " Castle of Sant' Angelo " in the Middle Ages, and had a very colourful history.

Examples of the second type at Caere, the " house " tomb, fringe the funereal roads. Steps lead downwards from the roads to a depth sufficient to allow the chambers to be cut wholly in the rock (29). The tombs are simplified representations of houses and vary in size and importance, no doubt in accordance with the means and social status of the persons who caused them to be made. Most have either one or two rooms, but some have as many as six. The intention to imitate house construction is often made clear by the representation on the rock ceilings of wide rafters sloping downwards from a central, heavy ridge beam, or by the imitation of " coffering ", a form of decoration derived from the lattice-like intersection of wood-beams, these creating deeply sunk rectangular panels. Entrance doorways ordinarily were built-up between burials, but sometimes there are pairs of stone doors, the two ponderous leaves made to turn on pivots, projecting from the outer flanges of the doors, these socketed into the lintel and threshold. Wide niches cut into the walls received the remains of the dead. The deceased either was laid there clad in armour or rich attire, or there was a sarcophagus or urn containing the incinerated ashes. Women were accorded similar funereal honours to the men; indicative of the

high esteem which women enjoyed in this remarkably advanced civilisation. In general, the practice of burying with the dead their most treasured personal possessions continued from first to last, but for a period of some 200 years at Caere, there was a sad departure from the open-hearted practice of the earlier colonising days, for the customary offerings were then merely represented in modelled stucco on the rock walls. Wall frescoes were very frequent. Architectural embellishment is common too; pilasters and piers, with entablatures and other mouldings, are of a character that confirms that the Etruscans were not notable originators in art, and drew their inspiration extensively from foreign sources. Both the Ionic and Doric orders are represented, in crude, malformed proportions, but with a compensating lusty vigour.



33. PLAN OF THE ROCK-CUT TOMB OF THE VOLUMNI, PERUGIA

Etruscan burial practices continued into Roman times and beyond; their subterranean tombs connect in type with the Early Christian labyrinths familiarly known as " catacombs ".

The tombs have the further importance of recording for us some evidence of the arrangements common in Etruscan houses. For town dwellings of the well-to-do we may turn to the Tomb of the Volumni, Perugia, a late second century B.C. construction which shows a close parallel of plan (33) with the oldest (third century B.C.) houses at Pompeii (cf. 46), strongly suggesting that the type represented was common to the peoples of Central Italy up to Roman Imperial times. A series of rooms surrounds the "atrium", which in the original would be lighted by an opening in the roof above. The principal rooms are the three represented at the inner end, the central among them being the counterpart of the chief domestic apartment, the " tablinum ". We know from other evidence that at least in some instances such houses were two-tiered, and that though there were few windows around the ground floor, the upper tier commonly had open fronted galleries, or even balconies, facing outwards. Such galleried openings, filled in with lattice parapets in their lower parts, are

represented in the stonework of the upper stage of the Porta Marzia, Perugia (28).

The inner half of the same tomb at Perugia—the wide chamber stretching the full width and the three rooms beyond, opening from it, a grouping frequently repeated in other tombs—corresponds with the normal lay-out of the developed Etruscan temple. The temples were of two types, the earlier single-celled and with a deep two-columned porch at the front but none at the rear; the later, developed type, triple-celled—each cell dedicated to a separate deity—with columned front porch as before, the whole standing on a high platform or " podium " and approached from the south by a broad flight of steps extending the full width of the plan (30). Not until quite late times (fourth century B.C.) were the walls of the three cells constructed in stone; timber framing, infilled with sundried brick and covered with stucco was normal, and the upper parts always were of timber from first to last. A famous and revered example of the developed class was the Temple of Jupiter Capitolinus, on the Capitol hill at Rome, begun by Tarquinius Supurbus and completed by his son in the late sixth century B.C. It was adorned with many fine terra-cotta sculptures, the work of Vulca of Veii, a celebrated Etruscan artist. Ornamentally moulded and vividly coloured terra-cotta slabs of a more ordinary sort were in very general use for the decoration of the widely over-hanging timbers of the temple roofs, but these commonly were the work of travelling Greek craftsmen, carrying their moulds with them.

Roman Architecture

The architecture of the two great nations, Egyptians and Greeks, of whom the preceding chapters have treated was essentially trabeated (*trabs*, a beam)—i.e. the openings were covered, and the superincumbent weight supported, by a flat horizontal beam or lintel. In Roman architecture, which we are now about to consider, the new principle—the arcuated—was rapidly developed; the arched form was used extensively to span openings and to shape vaults. Relatively, the post-and-lintel principle is elementary; it sufficed for the orthodox, mainly religious, structures of the Egyptians and Greeks, whose climate allowed them to live their life largely outdoors, but the Romans, because of the manifold responsibilities imposed by the control of their far-flung empire, needed a system capable of wider adaptation, one which, above all, would allow of the bridging of large halls or rooms without the hindrance of innumerable stone pillars. The

Romans were ardent admirers of Greek art, and did their utmost to translate it into terms suitable for their own uses, but for the most part their buildings were so much the more complex, and so much more varied in type than the Greek, that despite their best endeavours to adopt the Greek orders and elements entire, sweeping changes were inevitable. The Greeks had ignored the arch in their monumental architecture; in the Roman it became the dominant form and, being fundamental, intruded upon and modified the borrowed orders. Instead of colonnades, arcades became typical, though there were still occasions, as in the case of most temple architecture, where Greek precedent could be followed very closely. Greek buildings were rarely more than a single tier in height; the Roman sometimes reached four or five tiers, and consequently many new arrangements of the Greek stylar system became necessary. A great variety of similar new problems was encountered and new adjuncts to the orders had to be invented. Among new parts thus added and extensively used by the Romans were: the *pedestal*, derived from the temple podium; the *parapet*, this the original form of the balustrade—the baluster was not invented until Renaissance times—the *attic*, an upper storey, of greater height than a parapet, such as often is seen over a triumphal arch.

The Romans met their building problems with great resource and ingenuity, and structural development advanced rapidly, so rapidly indeed, that the evolution of decorative forms was quite outpaced. Yet they showed almost no sensitivity to the fine architectural forms proceeding naturally from their own magnificent structural systems, and throughout, continued to resort to the artistically unjustifiable course of sheathing their buildings with the now out-moded Grecian elements. They strained the orders to meet every possible decorative situation, and only invented new parts and uses under the most strict compulsion of circumstances. Structures and outward effect tended increasingly towards divorce. In Greek architecture, science goes hand in hand with art; the columns of the temple contribute both beauty and support, but in Roman buildings the hulk is the useful part and outward effect only a casually related veneer. These are, of course, generalisations; not all Roman architecture is just a husk and a sham nor is all Greek architecture "a joy for ever". There are many fine and worthy Roman buildings, though, one must confess, the best among them usually owe their qualities to their imposing dimensions and stately masses, or to the chance of being straightforward structures, effectively fulfilling a necessary purpose, which

the Romans had not thought to merit the dignity of architectural embellishment. Among bridges, viaducts, aqueducts, defensive city walls and the like, are found the most impressive of Roman monuments. But one must beware of under-rating the Roman contribution to architecture just because, in the most pretentious cases and by comparison with the Greek, buildings often are coarse, vulgar or tasteless in their externals. There is a reverse side to this picture. Roman structure is brilliant, amazingly advanced and magnificently adventurous in its scope and scale. By contrast, the abjectly simple, box-like creations of the Greeks are of negligible importance.

The taste for the architecture of Greece first manifested itself in Rome in the time of the Scipios, about 200 B.C. Italy and Sicily meantime had fallen to the Roman lot. Greece had become practically a province of Macedonia, and the victory of Paulus over the Macedonians, in 168 B.C., brought her under the sway of Rome. Scores of wagon-loads of statues and paintings, the spoils of seventy cities, afterwards found place in the victor's triumphal procession in Rome. At a later period, when some dispute had arisen between the Achaeans and the Spartans, the latter applied to Rome for help, and in response the Consul Mummius settled the question by landing in Greece and taking possession of Corinth (146 B.C.). After carrying off all the art treasures, and stipulating—in his ignorance as to their value—that if any were lost by the carriers they should be replaced by others of equal value, he set fire to the city. From this time Greece became the happy hunting-ground for works of art: the artistic treasures were freely pillaged, and their importation naturally had immense influence upon the buildings which were springing up in Rome; Greek architects also were introduced into Italy, and though they had to adapt their practice to the very different conditions of Roman building, they intensified its dependence on the architecture of their mother country.

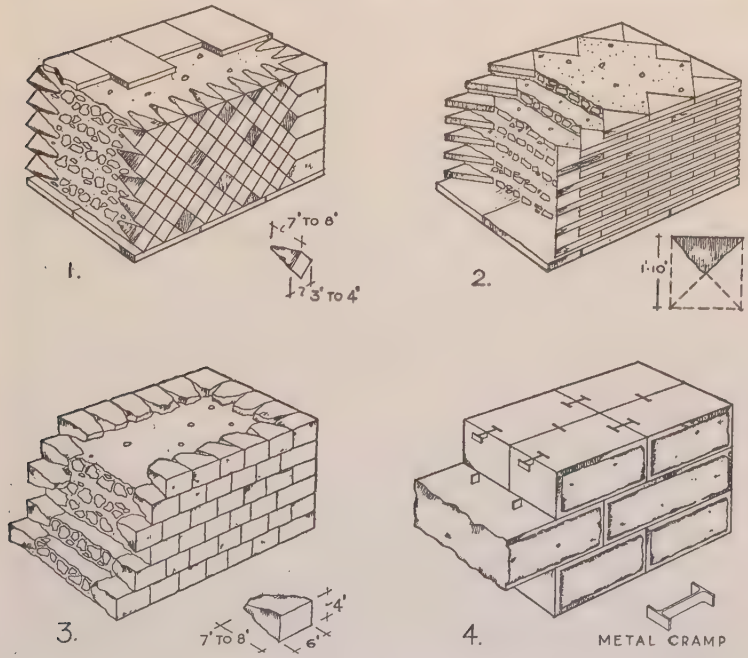
We see then, that in the one sense, Roman architecture was not an independent creation. In constructive science the Etruscan lead was maintained, and in this field the Romans had nothing to learn from the Greeks, but they remained always subservient to her in the visual arts.

Before dealing more fully with the *forms* which architecture assumed in the hands of the Romans, there is more to say regarding Roman modes and methods of construction, in which they so excelled. The Romans were, as we have seen, an inventive and thoroughly practical people, and they had an unrivalled knowledge of building principles and the use of materials. In whatever part of the Empire they built,

east, centre or west, they tested and selected local building materials with the greatest of care, and took infinite pains to ensure the adequacy of transport and supply. In the earlier periods of their history, all buildings of importance were constructed of solid, dry-jointed masonry, but before the first century B.C., the use of fine mortars had so developed as to make a radical difference in walling technique. The Romans discovered, in due course, that the lavish use of really good mortar, as a binding to small, rough-cut or broken stones, gave a very strong, almost homogeneous wall, superior in several important respects to the cut-masonry walls and very much more economical to construct, for far less skilled labour was required. The new technique consequently could be applied to all classes of works and not merely to those of superior class; it became possible to build on a vast scale, speedily and cheaply; this a matter of great moment to the Romans, whose building programme, due to the demands of empire, was enormous.

The discovery of the new kind of wall construction turned upon the fortunate coincidence of two favourable factors. In the neighbourhood of Vesuvius, where the development first took place, there were light, porous, volcanic stones, whose rough texture gave an excellent key to the mortar; and for the mortar there was a volcanic ash called pozzolana, which, when mixed with unslaked lime—obtained by burning lime-stone—and wetted, gave a mortar of unprecedented strength. Pozzolana takes its name from Puteoli, near Naples, but besides extensive deposits thereabouts it was found in abundance in the extinct volcanic area about Rome. Its equivalent was sought elsewhere and, where lacking, good substitutes were forthcoming. Provided that such tenacious mortars were lavishly used, and with small, sufficiently absorbent stones, the matured product had all the virtues of a first-rate concrete. The latter is perhaps a misleading, if convenient, term for us here to employ, as it has come to imply a quite different kind of building process to that normally followed by the Romans; for they did not mix all the ingredients together, as we do to-day, before placing the compound between boarded moulds, but built a wall much as rough-masons still do, alternating layers of hand-spaced stones with layers of semi-fluid mortar. Cut stones had still to be used to make trim outer faces to the walls; and the excellent craftsmanship displayed in pattern-ing the facing stones has given rise to all kinds of misconceptions as to how the Roman walls were built. The method discussed above, however, was that almost invariably followed. Boarded moulds were not used for walls, they were quite unnecessary; but when the technique

was extended to vault coverings, as happened almost immediately, wooden " form-work " definitely was needed. Yet here too, the method of laying the materials was the same, though the form-work then obviated the need for specially cut facings, and after the moulds were removed, the vault shapes emerged as though cast in one solid piece.



34. ROMAN WALL CONSTRUCTION.
1 AND 3, TYPES OF STONE-FACED CONCRETE. 2. BRICK-FACED CONCRETE.
4. HEAVY STONE " ASHLAR "

The face effects of these more or less homogeneous walls varied from region to region, within the Roman Empire (34). In the south of France, Spain, parts of North Africa and in this country, rectangular facing units of stone were laid in regular, shallow courses only a few inches high. Hadrian's Wall, in the North of England, is an instance, though the mortar there is less good than in the average case. Each facing course corresponded with a layer of rough broken stones in the body of the wall, these about fist size, completely surrounded by

mortar. In central Italy, the stone facing units were laid lozenge-wise, and at the best period—the time of Augustus—the work was extremely precise and the fine joints formed a meticulous diagonal-mesh pattern.

The Romans knew of and used brickwork. Their earliest bricks were sun-dried, not burnt, and were employed extensively for homogeneous walls until the later years of the first century B.C. It was such works that Augustus, first of the Roman Emperors, replaced with more robust buildings in the new "concrete" technique. His boast—recorded by Suetonius—that he found Rome of brick and left it of marble was by no means an idle one, for under his auspices the city witnessed a period of great splendour, and marble was extensively used; for the most part as a decorative sheathing to the ponderous concrete walls, or, as in the case of many temples, solidly in squared, great blocks. Heavy masonry was not, by any means, entirely superseded by the concrete technique; the very finest building works continued still to be built by the time-honoured methods, in great, trim blocks of stone or marble, laid in horizontal courses and secured together by lead-protected iron holdfasts. Heavy masonry too, was often used as an outer covering to the concrete cores of funerary monuments and temple platforms.

The concrete wall-technique proved by no means so trouble-free as the Romans might well have hoped. The walls were very ponderous, rarely less than two feet thick even for the lightest partitions, and six or eight feet was quite normal. They were homogeneous and rigid, yet their very rigidity proved their chief defect. For one good reason or another buildings can never rest completely inert; tiny, secret movements are for ever taking place, occasioned by temperature changes, unequal loading and foundational inequalities. Now mass concrete, though capable of bearing immense loads, is almost useless against the opposite "pulling" kind of strain. Great cast-concrete masses therefore were almost bound to crack—and this they did. Further, patches of wall facing tended to fall away, because, before the walls were quite set, their cores, having a greater portion of mortar than had their mason-cut facings, were the more compressible of the two and thus put the facings under greater strain than they could bear. The latter problem the Romans attempted to meet by substituting kiln-burnt brickwork, which is much stronger against pulling strains than is concrete, in place of the stone constructive casings which had served down to Augustus' time; and at intervals up the height, large, flat, tile-like varieties of the bricks were made to tail back well into, and

sometimes right through, the body of the wall (34, 2). Though the facings of the walls thus were changed, the process of building remained as before, a hand-spacing both of the brick facing elements and of the rough, stone inner units, in level courses throughout the full thickness of the wall. In Rome itself, and in certain other parts of the Ancient Empire, we thus see great sheer walls, apparently of brick throughout, though in fact the brickwork is little more than skin deep. Sometimes, though rarely in Rome, brick binding courses were introduced into concrete walls otherwise entirely of stone, the brick courses spaced at wide and irregular intervals up the height of the wall. Another precaution which the Roman slowly learned to take against the splitting away of the constructive wall facings was to increase the size of the joints, so as to equate the quantities of mortar between face and core. In later Roman brickwork the joint commonly is as deep if not deeper than the bricks. The latter usually were somewhat over two inches in depth and very long in proportion—up to and beyond two feet.

Against the first problem, the cracking and dislocation of walls and vaults, the Romans introduced " reinforcements " of brick arches into the solid body of both, passing right through from front to back, these so arranged as to resist and localise any exceptional strains that might develop. The famous domed Pantheon, finest and best preserved of all Roman buildings, externally presents a continuous face of solid, unbroken brickwork, but interwoven there is a series of tiers of what appear to be " blind " arcades, though they are in fact, deep arches running through the whole thickness of the twenty-foot wall. Similar reinforcing ribs of brick-tiles, as used in the case of vaults, may be seen in the great arches still surviving of the Basilica of Constantine. Towards the end of the Roman period the reinforcing of vaults had so developed that the embedded brick ribs form a complete lattice, dividing the concrete into numerous separate rectangular pockets.

The concrete technique did not fulfil its early promise to provide a complete answer to Roman structural problems; in fact, there is strong evidence to show that they were on the point of abandoning it, in favour of solid brick, before the emperor Constantine transferred the seat of government from Rome to Byzantium in A.D. 324. Already several important vaults had been constructed wholly in brick, including that of the Pantheon (A.D. 120–124) mentioned above. The Byzantines were the natural successors of the Romans; and their vaults, when not in cut stone, are almost invariably brick.

Thus, the Roman, by means of his inventive genius, was enabled

greatly to enlarge the scope of the architecture which had been handed down to him by the Greeks. In his hands the art was not confined to the building of temples, but was applied to new forms and adapted, in an original and daring manner, to the varied requirements of the people. Palaces, amphitheatres, baths, triumphal arches, basilicas, all on a scale of unparalleled magnificence, sprang up on every side, all presenting new problems in design and construction, which the Roman builders never shirked, but at once undertook to solve, and upon which they speedily stamped their individuality.

In many of these buildings were large halls, the like of which the Egyptians and Greeks had never known, for although covered by ceilings or vaults, they were clear of intermediate supports of any kind. These halls are quite commonly 80 or 90 feet wide—that is, more than twice as wide as the nave of the normal English cathedral. Some were spanned by light timber trusses—and these carried the roof—for the Romans had learnt the secret, denied to the Greeks, of assembling timbers into large, rigid frames, put together in accordance with the principle of triangulation. The Early Christians, and the mediaeval builders after them, profited greatly by this Roman invention of the roof-truss.

More amazing still is the daring skill evidenced by such vaulted halls as in the Basilica of Constantine, where the span from side to side was over 80 feet; great, ponderous masses of masonry, poised some 100 feet above ground. No wonder that Roman walls were massive and that tremendous buttresses were needed to counter their crushing, thrusting loads. It is sometimes said, that as such vaults were cast solidly in one continuous concrete whole, there would be no outward thrust, and that the Romans could and did dispense with buttresses, but this is quite wrong. The vaults would remain homogeneous just so long as they were stoutly held in place, and this the Romans themselves thoroughly well knew. They had learnt how to counter thrust with thrust, and already knew and used all the main types of buttress employed in Gothic architecture of later times. They invented the " flying " buttress; it is used to retain the vaults over an intriguing two-storey, covered shopping-arcade which formed an outlying part of the grand and spacious Forum of Trajan. This shopping-hall was dramatically re-discovered in fairly recent times.

The Pantheon (35) is Rome's greatest miracle of constructive science. It is a hollow cylindrical mass, three tiers in height, within which, springing from the top of the second tier, is fitted the shell of a dome,

35. THE PANTHEON, ROME

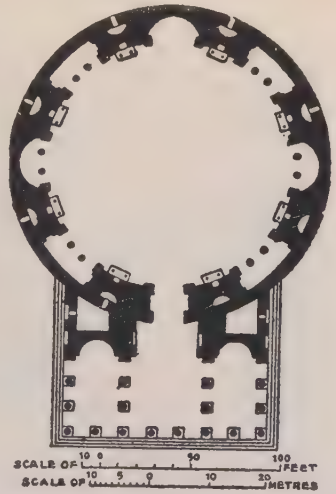
36. NÎMES. ROMAN TEMPLE KNOWN AS "THE MAISON CARRÉE"

37. THE COLOSSEUM, ROME

four feet thick. The dome is wedged in place with solid concrete; only its upper part can be seen outside. The top tier acts as a continuous buttress and prevents the base of the dome from splitting outwards. The cylindrical walls, 20 feet deep, conceal a most ingenious supplementary buttressing system, the complexities of which are not, even yet, fully understood (38).

Out of the three orders of Greece and the Etruscan models were evolved five Roman orders.

(1) The Tuscan, a simplified form of the Doric, inherited from the Etruscans. It was over-simple for the Roman florid taste and was rarely used by them. No recognisable example of the full order survives; the entablature appears always to have remained in timber. The stone columns were made smooth—without flutes.



38. PLAN OF THE PANTHEON, ROME

(2) The Doric, which retained the triglyphs. Like all the Roman orders it had a base. It differed little from the Greek original, except for the addition of a few, small mouldings.

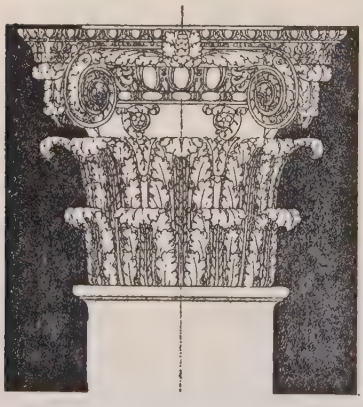
(3) The Ionic, again similar to the Greek, but having a less rich capital, with smaller volutes. In earlier days, a four-sided capital was normal, but later, the double-faced type, as used by the Greeks, returned to favour.

(4) The Corinthian, the favourite Roman order. At first, the entablature was identical with the Ionic, but a series of bracket-shaped, scrolled " modillions " was introduced into the lower part of the cornice, late in the first century B.C., and thereafter became characteristic of the order, apart from occasional reversions.

(5) The Composite, a not very distinct variant of the Corinthian, first used in Rome in the first century A.D. The capital (39) combined Ionic volutes with the two lower ranges of acanthus leaves proper to the Corinthian. The entablature usually had either scrolled or block-shaped modillions, or, occasionally, the Ionic cornice was again made to serve.

The separate identity of the orders was not rigidly preserved, and

as regards the latter three, the entablatures were interchangeable; it was the Renaissance architects who, in the fifteenth century and after, laid down their proportions so concretely. Relative, though not precise, proportions were observed. Tuscan columns were about seven diameters high and the degree of slenderness of the other orders rose, in the sequence given above, to about ten diameters for the Corinthian and Composite. The latter two, apparently, were regarded as equal in decorative importance. All were heavily overladen with carven ornament in the later Empire period, and capitals sometimes were grotesque departures from the normal types. Each of the orders was variously used; free-standing, partly attached to a neighbouring constructive wall, or in pilastered form. (The pilaster derives from the Greek anta). The columns or pilasters were sometimes used in pairs, an illogical arrangement which the Greeks would have abhorred; and frequently too, to enframe arched openings. Licence showed itself also in irrational treatments of cornices and pediments, which might be broken out of structural line at whim, or lengths omitted altogether; or in the enframing of wall openings and sculpture-filled niches with miniature pedimented orders, perched precariously on wall-brackets. Nowhere was the Roman decorator less restrained than when designing the permanent marble scenery gracing—or disgracing—the theatre stage.

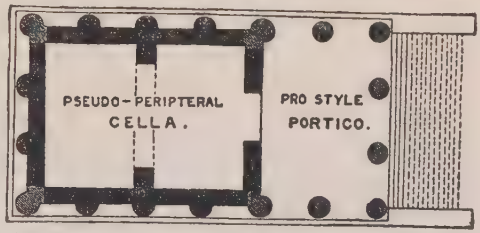


39. ROMAN COMPOSITE CAPITAL FROM THE BATHS OF DIOCLETIAN, ROME

We saw that the story of architecture in Greece was told almost entirely by her temples. This was not the case in Rome; temple building was not the strong point with the Romans—though in the time of Augustus the city must have been well supplied with them—and very scanty remains now exist.

The illustration (40) shows the plan of an early temple of the Ionic order, the so-called Temple of Fortuna Virilis, which may not be its real name. It dates from about 40 B.C. By fortunate chance the building has been well preserved. It stands upon a lofty podium and

has the broad flight of steps, the full width of the plan, typical of Roman as well as of the later Etruscan temples. Yet it has but the one cella; the Etruscan triple-unit does not appear now, or later. It faces roughly north; but this circumstance has no significance for Roman temples were variously aligned, according to the convenience of the Forum or market place in which they commonly stood. South appears to have been the usual aspect for Etruscan temples, so in this respect too, Etruscan precedent is disregarded. The cella is short and wide and is divided by piers which help to carry the roof. The portico is inordinately deep and ranging with its side columns we see a series of engaged part-columns, these so characteristic of Roman architecture as a whole. The details of the temple have something of the purity of Greek work, as we might well have expected in view of its period.



40. PLAN OF THE TEMPLE OF FORTUNA VIRILIS OR MATER MATUTA, ROME

As might be expected, we find that, throughout the earlier period, when Greek artistic influence was at its height, the buildings of Rome were characterised by simplicity and purity of style; but the increasing splendour of the empire was soon reflected in its architecture. If we are to judge by artistic standards alone, the point of culmination of Roman art and architecture must certainly be set in the reign of Augustus (27 B.C.–A.D. 14) but constructively, Rome was then but newly launched on its audacious course. There were several mighty builders among the later emperors, but it was, perhaps, in the time of Hadrian (A.D. 117–138) that architecture, in the comprehensive sense, reached its peak of florid grandeur. At that time there was a brief revival of good taste, but the fine quality of the Augustan works was at no time surpassed.

Augustus kept his artists and craftmen busy, for during this emperor's reign were built no less than twelve temples, including those of Castor and Pollux and of Mars Ultor; in addition to these works he restored or helped to complete more than eighty others, and numerous secular buildings. Among the secular buildings the theatre of Marcellus, completed by Augustus 11 B.C., is a good example of the use by

the Romans of the " engaged " column as a decorative feature, the orders being superimposed—Doric on the ground floor, above this the Ionic and, probably, as in the Colosseum, the Corinthian on the third storey.

Many of the buildings of Rome were utilitarian, and even the temples appear to have been useful for purposes other than of worship. Recesses in the podium of the temple of Castor and Pollux, for example, served as offices for checking weights and measures, for many bronze weights exist with the inscription " *ex ad: Castor:* " showing that they had been examined and verified at the temple.

It has been shown that the Romans excelled as constructors, and that the materials used by them were of the most enduring kind. How comes it, then, that of the colossal and numerous buildings erected at this period, relatively few remain to-day, even in a fragmentary state?

The disappearance of the old monuments may be accounted for in two ways. Firstly, by the wanton destruction, at the hands of successive emperors, of the works of their predecessors. Each new ruler, either as a bid for popularity or in his own selfish interests, endeavoured to surpass, in magnificence, everything that had been done by those before him, and in these efforts at self-aggrandisement the existing buildings were treated with scant respect. When Nero, for example, wished to carry out an extensive scheme which he had prepared for the rebuilding of a portion of the city, he is said to have cleared a site by means of the great fire of Rome. He was thus enabled to proceed with the work, building, among other monuments, that vast and wonderful palace, the " Golden House of Nero," the most lavish, selfish and costly structure that Rome had seen—a group of buildings which, it is estimated, covered as much space as is now covered by S. Peter's, the Vatican, and the Vatican Gardens ! A few years later Vespasian and Titus, each in his turn, wishing to please the people by the construction of the huge amphitheatre, the Colosseum, and of extensive baths, concluded that the site of Nero's great palace and pleasure grounds was the most eligible for the purpose. Without delay, down came a great part of the Golden House, in order to provide a space for the new buildings. Trajan completed its destruction later by the erection of his immense baths, almost upon the very site of the Golden House, so that it is now difficult to trace even the vestiges of Nero's stupendous work.

Secondly, as Christianity spread in Rome, the temples—representing the old Pagan religion—were not only neglected, but were, in many instances, destroyed, the materials being re-used in the construction of

new buildings. This state of affairs lasted for centuries. The marble temple of Castor and Pollux, to take an example, was, during this period, almost carried away piecemeal. Michael Angelo used a portion of one column for the pedestal upon which was set the equestrian statue of Marcus Aurelius; another portion was made into the marble statue of Jonah, designed by Raphael, in the church of S. Maria del Popolo. The great Basilica Julia, in the Forum, another Augustan building, was used as a marble quarry in the Middle Ages; the greater part of the structure was carried away for building purposes, and the remainder was burnt into lime on the spot. In the course of some excavations, three lime-kilns were found in this building.

Small wonder, then, that for the finest example of a typical Roman temple we have to go out of Rome, and indeed out of Italy, to the Maison Carrée, at Nîmes, in France, erected in A.D. 6 (36). This temple differs very little, in the arrangement of its parts, from the temple of Fortuna Virilis, to which we have previously referred. In each case the edifice rests upon a raised podium, requiring a flight of steps in the front for access to the floor. The portico is deep in proportion to its width, and the walls of the cell are decorated with engaged columns, which range with the free columns of the portico. Here the columns are fluted, but in Roman architecture, unlike the Greek, the shafts were often left plain, for a very sound reason. Besides using marbles lavishly for the lining of the walls of mansions, temples and other rich buildings, the Romans quite frequently used them in great monoliths for the shafts of columns, indoors and out. The whole resources of Greece, the Aegean Isles and the near East were tapped for supply. As the marbles usually were coloured, and perhaps veined, flutes and joints would have impaired the appearance, and both were in such instances omitted. The practice tended to spread to the finish of columns built in white (native or foreign) marbles, which often were left sympathetically plain.

After the Augustan age, as wealth continued to pour into Rome, the magnificence of the city increased, for the Romans' method was, in the words of Pliny, " to take everywhere whatever they thought worth taking," and the buildings of the period were the natural outcome of the increasing licence and prodigality of the times. A typical building was the Flavian amphitheatre, better known, from its vast proportions, as the Colosseum (37), begun by the first of the Flavian emperors, Vespasian, about A.D. 75.

For the Greeks' form of amusement—dramatic representation—the

Romans cared little; but they were passionately fond of gladiatorial shows and contests. Wherever a Roman settlement existed—in Britain, in Gaul, or in the mother country—traces are found of these amphitheatres. As would be expected, Rome claimed the most gigantic of them all.

The Colosseum was built in the form of a vast ellipse, 620 feet long, 510 feet wide, and 280 feet high. In the centre, communicating with the wild beasts' dens, was the arena in which the gladiatorial contests and spectacles were held; around this, rows of seats, rising in tiers, gave accommodation to 45,000 spectators, who were partially protected from the sun's rays by a huge awning. The structure was built mainly of solid travertine, with other stones, brick or concrete in subordinate parts, and was skilfully planned to allow the whole audience a clear view of the arena. On the exterior the three lower stories formed continuous arcades of semi-circular arched openings, eighty in number. In front of the piers which separated the openings were engaged columns used, after the Roman manner, as decorative accessories; the Tuscan order in the lowest storey, the Ionic in the second, and the Corinthian in the third. The fourth storey, consisting of an almost unbroken wall divided by Corinthian pilasters, was added, or rebuilt, at a later date. It served to support the masts, fixed round the building in a series of corbels, from which the great awning was stretched.

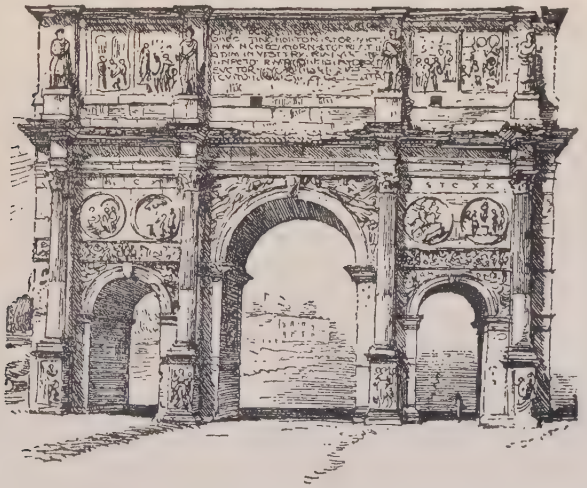
The vast scale upon which the Colosseum is built renders it one of the most imposing ruins of the world; but, apart from its skilful construction, it had little architectural merit. The exterior, with its endless repetition of arches and useless columns, was monotonous. Such a building, persistently devoted to the most brutal contests, was a typical product of Roman civilisation. For more than 300 years it was the scene of bloody contests of gladiators and prisoners, and echoed with the multitude's

loud-roared applause
As man was slaughtered by his fellow-man

until the year A.D. 403, when the better feeling of the people was aroused by the self-sacrifice of a monk named Telemachus. His story is the one redeeming feature in the long history of the Colosseum. In order to protest against the wanton cruelty, the monk rushed on to the arena, and fell a victim to the rage of the spectators; but the moral effect was such that human slaughter in the contests was discontinued.

Huge as was the Colosseum, there was another building devoted to Roman " sports "—the Circus Maximus—which far surpassed it. No

vast building in Rome has vanished so completely as has this great circus; from its mass, no doubt, " palaces, half cities, have been reared," for almost every vestige has disappeared, so that its very name is hardly recalled by the visitor to the sights of modern Rome. From comparatively small beginnings in the time of the Tarquins, the Circus Maximus gradually developed until, after its restoration by the Emperor Claudius, it held, according to Pliny, no less than 250,000 spectators. Additional splendour was added by Trajan, under whom the vast building was



41. THE ARCH OF CONSTANTINE, ROME

wholly covered, inside and out, with white marble, relieved with brilliant mosaics, oriental marble columns and statuary. " It must then," says Professor Middleton, " from its crowd of works of art, its immense size, and the splendour of its materials, have been, on the whole, the most magnificent building in the world." In the fourth century it covered an area of more than four times that of the Colosseum, and accommodated—according to records—the almost incredible number of 485,000 spectators.

Triumphal arches, in commemoration of victories, were striking features in Roman design. In the second century A.D. the city contained no less than thirty-eight. Of the few that remain, the arch of Titus, erected A.D. 82, to commemorate the conquest of Jerusalem, is best known for its fine proportion and the excellence of its details.

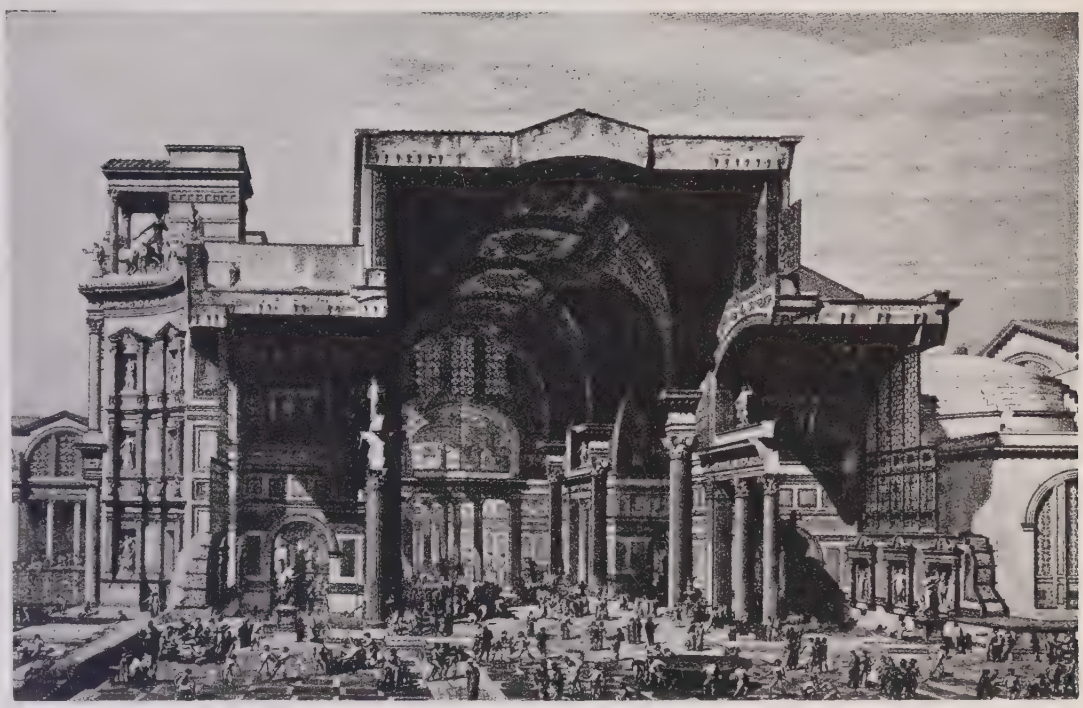
The arch of Septimius Severus (A.D. 203), in the Forum, and that of Constantine (*cir.* A.D. 315), are left as examples of the later work. The latter (41), though built at a period when Roman art was most degraded, contains some excellent sculptures and details. This is explained by the fact that the marble columns and entablatures, the sculptured panels (representing Trajan's victories), and the colossal statues of Dacian captives, are of much earlier date, for they were taken from the arch and forum of Trajan—another illustration of the ruthless manner in which the emperors destroyed the works of their predecessors. At a later date one of the fine columns of black Numidian marble was carried off for use in the church of S. John Lateran, where it now stands.

The purely decorative purpose of the columns is shown by the fact that, in order to give them the appearance of supporting something it has been necessary to break out the entablature over each capital. In this special case, the great statues they support afford an excuse for the presence of the columns; but in many examples of Roman work the uselessness of the column is too apparent.

Under the Flavian emperors, towards the end of the first century, art in Rome was at a very low ebb, although buildings of colossal extent were erected by these rulers to please the taste and catch the votes of the populace. Under Hadrian, however (A.D. 117–138), as has been mentioned, there was a great revival of taste, not in Rome only, but in the provinces, and especially at Athens, where the emperor rebuilt part of the city, and completed the great temple of Jupiter Olympius, begun 300 years before.

To Hadrian's time belongs the great circular Pantheon (35), one of the noblest of all buildings of ancient Rome, built upon the site of an earlier rectangular temple erected by Agrippa; the portico was, indeed, rebuilt from the materials of the older temple, and has Agrippa's inscription upon its frieze. The great dome, spanning 141 feet, is almost exactly the same diameter as S. Peter's, though apparently much bigger. To lighten the weight, as well as to add to the attractiveness of effect, five ranges of rectangular, stepped, sinkings or "coffers" run the circuit of the lower part of the dome, these cleverly arranged to allow for the fore-shortened view of the spectator below. At one time there were bronze-gilt foliated decorations in each of the coffers. The concrete-covered, constructive walls, within which are eight large, columned, recesses, were encrusted with precious marbles, and the bronze doors, which still exist, once were plated with gold.

Light was admitted to the Pantheon in an impressive manner by



42. PERSPECTIVE VIEW OF THE CENTRAL HALL OF THE BATHS OF DIOCLETIAN, ROME

From the restoration by M. Paulin

43. S. SOPHIA, CONSTANTINOPLE

means of a circular opening, 30 feet in diameter, at the top of the dome. "There is," says Fergusson, "a grandeur and a simplicity in the proportions of this great temple that render it still one of the very finest and most sublime interiors in the world. It possesses, moreover, one other element of architectural sublimity in having a single window, and that placed high up in the building. I know of no other temples which possess this feature, except the great rock-cut Buddhist basilicas of India. That one great eye opening upon heaven is by far the noblest conception for lighting a building to be found in Europe."

The exterior is less imposing, though, in its best days, when the lower portion of the walls was encased in marble, the pediment and attic embellished with bronze statuary, and the roof covered with bronze gilt tiles, few buildings surpassed the Pantheon in magnificence.

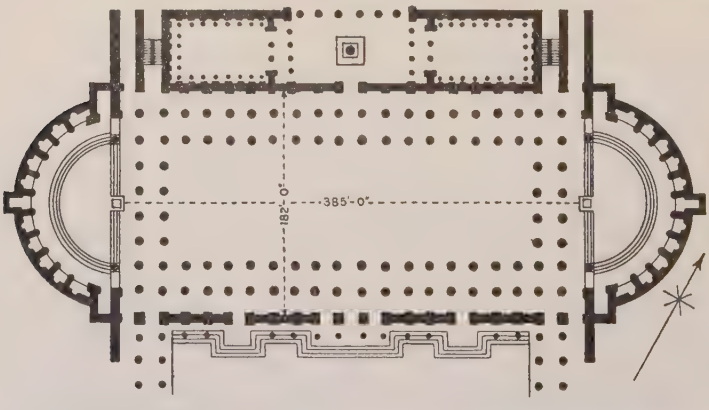
Space will permit only of a passing reference to the *thermae*, or colossal baths, which were, at one period, the most conspicuous feature of Roman architecture, and the most remarkable of all buildings in magnitude and splendour. These vast structures, which comprised public and private baths of all kinds, gymnasia, libraries, theatres, lecture-halls, all fitted up more lavishly than the most luxurious of modern clubs, were built simply as bribes by the emperors, one after the other, to secure the vote and favour of the people. The earlier baths—of Agrippa, Nero, Vespasian, Trajan, and others—have almost entirely disappeared; two only, of the later emperors, remain in a sufficiently perfect condition to allow a restoration to be made with any degree of certainty.

The baths of Caracalla (A.D. 211) covered a site little less than a quarter of a mile square, and now form the most extensive mass of ruins in Rome, though they suffered much, in the sixteenth century, at the hands of Pope Paul III., who carried off vast quantities of the material for use in the construction of the Farnese Palace.

The baths of Diocletian (42), built a century later, were probably still vaster; the grand hall, 200 feet fong—restored by Michael Angelo, but still retaining the original columns and vaulting—now forms the church of S. Maria degli Angeli.

We have made no mention yet of another type of building in Rome, which was destined to exert very considerable influence upon the architecture of succeeding ages. Rome was a great commercial centre, and the public business of the city, commercial and judicial, occupied the attention of the people far more than did their religious affairs. This business was transacted in large, lofty buildings called *basilicas*,

which served the purpose of halls of justice as well as commercial exchanges. A special interest attaches to them from the fact that they served as models for the first places of worship built by the early Christians of Rome, and that they thus became the recognised type for churches built for Christian worship. Compared with other Roman structures and with one or two notable exceptions, they were slightly built; and as the materials of the old basilican halls were found to be exceedingly useful for the construction of the new churches, extensive use was made of these ancient buildings for this purpose, so that few remains of the old basilicas of pagan Rome exist. The fate of the



44. PLAN OF THE BASILICA ULPIA, IN THE FORUM OF TRAJAN, ROME

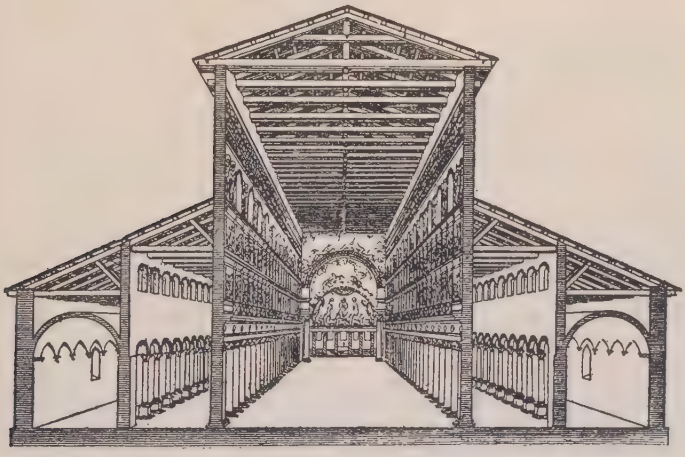
great Basilica Julia, in the Forum, has already been referred to; the remains of the Basilica Ulpia, erected by Trajan (A.D. 115), may still be seen in Trajan's forum, adjoining his column.

In the plan of this building (44) we have a great hall, 385 feet long by 182 feet wide, consisting of a wide, lofty central nave occupying half the width, flanked by double aisles with lower roofs. At each end is a semi-circular recess, or apse, called the *tribune*, round which, upon a raised dais, were the seats for the magistrates, or assessors, the central seat, at a higher level than the others, being set apart for the chief magistrate who presided over the business.

The roof of the basilica was usually of wood, with the nave portion considerably higher than that over the aisles, so as to allow the introduction of a clerestory wall and windows above the columns (*cf.* 45). The Roman conquest of space, achieved by the agency of the

triangulated, timber roof truss, or by colossal, leaping vaults, was triumphantly demonstrated in this and similar types of building.

It was not until the later Empire that vaulted construction was applied to the basilicas. Constantine completed the building which had been begun by Maxentius near the Roman forum, now called the basilica of Constantine. The one surviving aisle, spanned by three massive concrete vaults, affords the visitor of the present day an excellent opportunity for studying the Roman methods of building.

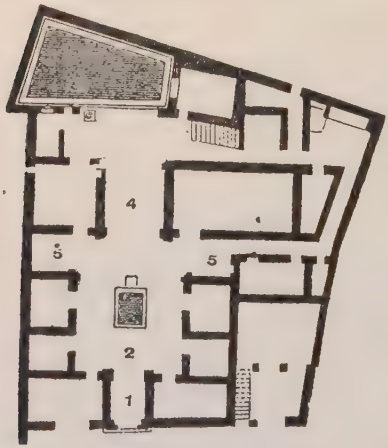


45. PERSPECTIVE SECTION OF OLD S. PETER'S, ROME (A.D. 330)

Of the private houses or homes of the Romans there are few remains in Rome itself. During the last years of the Republic, however, the Palatine was a favourite place of residence of the great Romans. Cicero, Catiline and Hortensius lived there; but few traces of houses remain, with the exception of the house of Hortensius, or " House of Livia," as it has been usually called. This house was bought by Augustus and used for a time as a meeting place of the Senate. It owes its preservation probably to the respect in which the founder of the Empire was always held. The painted decoration of the house belongs to his period.

Good examples of domestic architecture are found in the towns of Pompeii and Herculaneum, which were destroyed—or, rather, buried—by the eruption of Vesuvius in A.D. 79. But a great number of the people were forced to live in flats, and for typical houses of this kind

we must go to Ostia, the ancient port and emporium of Rome, where may be seen the remains of many flats of the period. These were built in large, three or four storey blocks, arranged around inner, common courts. Groups of flats were approached by separate staircases, opening from the streets at intervals; and there were alley-ways leading to the courts, where water was provided at a central fountain. Continuous lines of windows looked out over street or court, and the more important apartments had gay balconies. Shops and warehouses occupied parts of the ground-floor street frontage—in short, the tenement blocks agreed quite remarkably with the comparable type of building to-day, except in the minor domestic arrangements and in the fact that water, though abundantly supplied, was not carried above the ground floor.



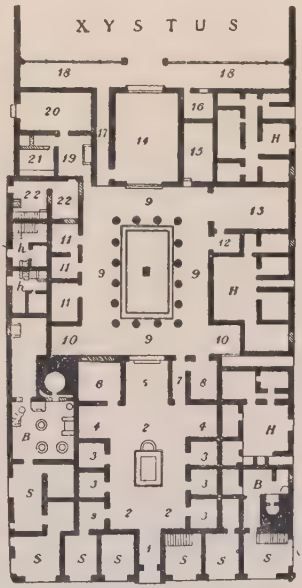
46. PLAN OF THE HOUSE OF THE SURGEON, POMPEII

At Pompeii, flats were rare, for this was a provincial town of no great importance and space was relatively cheap. The houses were the homes of the moderately well-to-do. The "House of the Surgeon" there (46), mentioned earlier, had the old, native Italian type of plan, derived from, or at all events, shared in common with, the Etruscans. All rooms faced into the Atrium, a large central, top-lighted space. The principal apartment was the Tablinum, facing the entrance.

The later houses commonly show the addition (in effect) of a complete new suite of rooms, arranged around a peristyle court, beyond the atrium part. This peristyle unit is a borrowing from the Greek, and when joined with the essentials of the older kind of house, admirably suited the Roman double life—public (atrium), private (peristyle). The so-called House of Pansa will serve to illustrate the developed type (47).

Most of the rooms adjoining the street were independent shops (S), bakeries (b), or were separate small houses (H); the domestic rooms faced inwards. The entrance lobby (1) led to the Atrium. Under the central opening in the Atrium roof—called the *Compluvium*—was the

Impluvium, a shallow, marble tank which collected the rainwater. In the Tablinum—occupying its normal position, the family archives and domestic treasures were kept; and flanking it on either side were *alae* or recesses for conversation and reading. Six other small rooms, *cubiculae*, three on either side, were for sleeping. The room immediately adjoining the Tablinum, to the left, served for formal receptions. On the opposite side of the Tablinum, a passage led to the more private portion of the house, and here, ranged about the peristyle with its central small garden, were more sleeping rooms and a recess for leisurely recreation—these on the left; and beyond them on the same side, the *Culina* or kitchen. Centrally opposite was the *Oecus*, the largest room in the house, for the more domestic receptions and for banquets on special occasions. Nearby, on the right, were two everyday dining-rooms, one for winter and one for summer. At the back of the house was the *Xystus*, a tiny garden.



47. PLAN OF THE HOUSE OF PANSA, POMPEII

The walls of the interior were decorated with marble slabs or with fantastic paintings; "Pompeian decoration," as it is called, from the fact that we have been made familiar with it from the well-preserved walls of Pompeii, though it was probably in general use among the Romans of the period. The paintings of the patrician houses in Rome were superior in technique and execution, but similar in character. In this decorative scheme the wall-spaces were divided into darkly coloured panels by means of attenuated painted columns; in the centre of the panels graceful and highly finished human figures or architectural and perspective views were introduced. Frequently the plinth, or lower portion of the wall, was painted a very dark colour, almost black; above this, a deep red or brown was used, occasionally blue or yellow.

There are several successive styles recognisable in Pompeian painting, but whilst the dominant external influence nearly always was the Greek, Egyptian art affected its character quite materially after the earliest

times. Certain of the forms represented are native to the Nile banks, and it is probable that the weird exaggerations of proportion and the grotesque combinations of human and vegetable elements were suggested by Egyptian observances and their highly conventionalised, brilliant-hued, mural art. The very word " grotesque " was coined to describe paintings of this class which were discovered in Renaissance times on some vaults of grotto-like substructures under the mouldering ruins of the Thermae of Trajan. Painters of the day seized on them avidly, for they had not seen their like before; they served as models to Raphael for the decorations at the Vatican on which he was then engaged.

We have now completed the short story of the two great styles—Greek and Roman—comprising what is known as " Classical architecture ". The histories of the two are inseparable, yet they differ strangely—the refined, exquisitely proportioned work of the Greeks, and the vast, magnificent, daring undertakings of the Romans.

CHAPTER IV

EARLY CHRISTIAN AND BYZANTINE ARCHITECTURE

DURING the first three centuries of the Christian era the new religion, though despised and discredited, had been slowly gaining ground, in the face of enormous difficulties. Rome, as we have seen, was given over to the worst kind of licence and debauchery. The old pagan religion was entirely played out; the majority of the people thought nothing about religion, pagan or otherwise; while, of those who took the trouble to think at all, few had any faith in the old creeds. The monumental undertakings of the emperors, whether sacred or secular, were not prompted by piety or by the spirit of reverence; and among the people the more thoughtful and intellectual viewed the prevailing licentiousness and prodigality with apprehension:

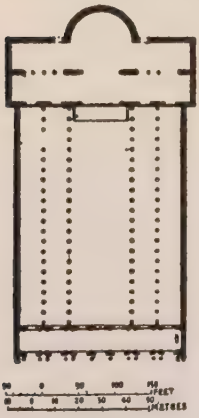
> On that hard pagan world disgust
> And secret loathing fell,

and men's minds were gradually being prepared for the great upheaval.

On the other hand, it must be remembered that the Christian doctrines were not such as would be cordially welcomed by the vast majority among the pleasure-loving Romans, and the new worship had, in consequence, to be carried on in secret; hence the earliest forms of art which it developed were sepulchral, consisting of the memorials and symbols of the faith found in the Catacombs.

The religion had little direct influence upon architecture until it was officially recognised by the Emperor Constantine in the year A.D. 313; but once it had taken its position as a state religion, and had come forth from its secret places and subterranean haunts, the need for shelter for Christian worship at once arose. The old temples were not suitable for the accommodation of large congregations, and there was, perhaps, some hesitation about making use of buildings which had been specially designed for pagan worship. In their dilemma the early Christian builders turned to the great halls of commerce, the basilicas, and found what they were wanting. The interior arrangements of the basilica suited the requirements of the new worship, and, as builders with inventive genius were scarce in Rome at the time, for reasons to

be mentioned shortly, it thus came about that the first Christian churches were built in direct imitation of these great houses of assembly. As we shall see in succeeding chapters, this model, once adopted, was never departed from. There was no lack of materials, for the city was filled with buildings upon which all kinds of extravagance had been lavished, and which were now beginning to fall into disrepute and neglect. Columns and rich capitals, marble linings, architraves and ornaments were appropriated wholesale, and applied to new purposes, and while pagan Rome suffered, Christian basilicas sprang us as rapidly as the now impoverished resources of Rome, and Italy in general, would allow.



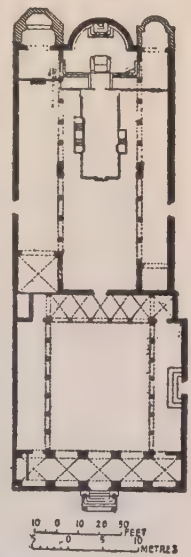
48. PLAN OF S. PAUL OUTSIDE THE WALLS

For great changes meantime had taken place. Constantine had transferred the seat of government to Byzantium in A.D. 324, renamed Constantinople after him, and with him had gone the cleverest master-builders and the best craftsmen; and so, too, the old Roman building traditions. Politically, the ancient city of Rome had then entered on a train of dire misfortunes. By the sixth century, war, pestilence and famine had brought her to the utmost depths of degradation and her population had shrunken vastly. It is indeed remarkable that the Early Christian builders wrought so well as they did, and not surprising that their architecture is light and simple in form and economical in all its arrangements. In the three centuries after Constantine which usually are allotted to the Early Christian style—though it lingered on with waning vigour until the tenth—more than thirty basilican churches were built in Rome alone.

The old pagan religion survived the legalisation of Christianity for a while, especially in Rome, but with ever diminishing strength. In 408 an edict of Honorius deprived it of all its temporal possessions, and the Christian creed then became overwhelmingly dominant. Despite their general unsuitability and restricted proportions, some few of the pagan temples were clumsily altered into churches, and there is at least one authentic case of the conversion, in A.D. 370, of a Roman basilica; that now known as Sta Maria Maggiore.

The early poverty of the Church and the need to develop its resources and organisation may explain why there is to-day so little definite

evidence of new building in Rome in the early fourth century. No building dating from the time of Constantine now survives. The church of S. John Lateran was built in his reign, but all trace of its early work has disappeared under the changes of later centuries. Perhaps the most beautiful of all the Christian basilicas of the time was that of S. Paul Outside the Walls, built by Theodosius in 386 (48). Unfortunately, a great portion was destroyed by fire in 1823, but it was rebuilt with much of its former splendour—" the noblest interior in Europe, and nobly and faithfully restored," it is called by Ruskin, who seldom sang the praises of the restorer. The sketch plan of the basilica shows how closely the Christian building follows the line of its pagan prototype.



49. PLAN OF S. CLEMENTE, ROME

The typical early basilica was quite simple (45). It was rectangular, divided longwise by regular ranges of columns into a nave and either two or four aisles. Almost invariably, each of the aisles was precisely half of the width of the nave, unless the aisles were double. There were windows in the aisle outer walls and in the raised upper portion of the nave walls. The double-sloping nave roof was supported by wooden, triangular trusses spaced at short intervals, and there were half or part trusses over the aisles. A semi-circular apse filled one end of the nave and at the opposite end was a colonnaded or arcaded entrance porch or *narthex*, measuring the full width of the church, which in the earlier buildings was usually built as one side of a square, so as to form an open courtyard. In the centre was a fountain, for ablutions. This courtyard or *atrium* occupied a considerable area, and gradually tended to disappear as space in the towns became more valuable. An example may still be seen in the church of S. Clemente (49).

Restoration in later days has destroyed much of the interest, historical and architectural, of these early basilicas. Sta Maria Maggiore, though to some extent restored in the Renaissance period, when the panelled ceiling was added, still retains almost its original aspect and affords the best example of an old Christian basilica in Rome. It had nave and two aisles, apse and narthex; but not an atrium. Above the Ionic columns, the clerestory wall is carried upon an architrave, instead

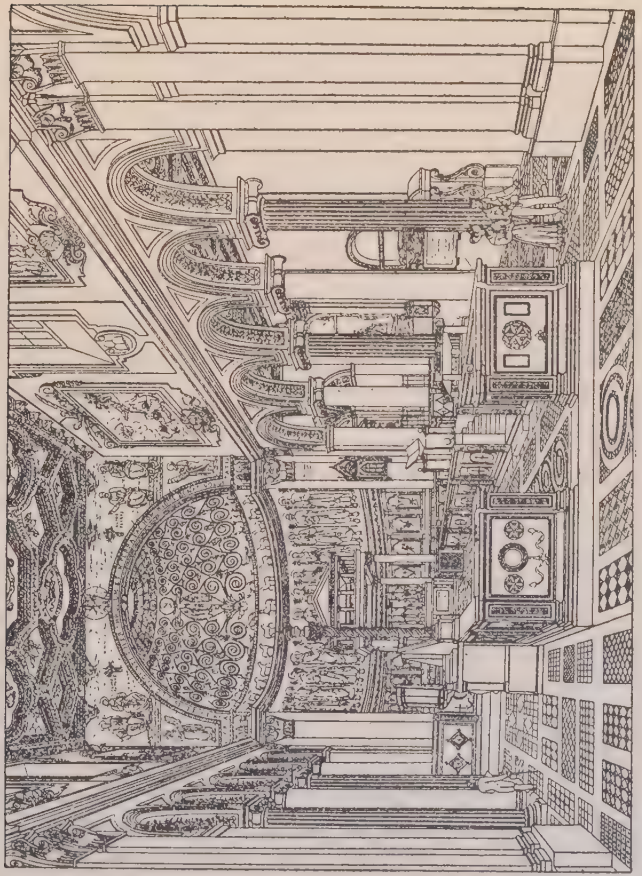
of a series of arches as in the case of S. Paul Outside the Walls, S. Clemente, and other basilicas.

The builders of the period possessed little inventive genius, nor did they concern themselves greatly about architectural effect. The generally accepted type of building, borrowed from their pagan forbears, satisfied them, and was never changed unless the exigencies of the service demanded an alteration; but changes necessarily had to be made. The alterations or additions made to the early nucleus were in nearly all instances due to the development of ritual and to the demands made upon space by an ever increasing number of clergy.

As we have seen, the earliest churches closely resembled their Roman prototypes in all important respects of structure and arrangement, and even in the matter of use there were similarities. The positions once occupied by the praetor and his assessors in the apse of the pagan basilica were now taken over by the bishop and his officers. The central seat at the base of the apse became the bishop's throne, and the clergy sat on the benches on either side of him. All the seats were elevated a little above the general level of the Church. The altar lay just in front of the apse as it had done in Roman days. In a few instances these ancient dispositions have survived down to modern times. They were retained when the old basilican church of S. Peter's at Rome, first erected in A.D. 330, was rebuilt in the Renaissance period. The Pope's throne stands in the middle of the apse and the high altar occupies a position in front, under the centre of the great dome.

The choir, and such of the minor clergy for whom there was insufficient space in the apse of the early churches, were accommodated in front of the altar in the body of the nave, in a rectangular space enclosed by a low marble screen or a railing; pulpits, or "ambos", were arranged on each side of this reserve. S. Clemente, a foundation of the fifth century, although rebuilt in the eleventh, still retains its old plan, including the original marble choir enclosure with ambos on either side; and we may see there too, a fine example of a "baldacchino" or columned altar-canopy, a feature of great dignity which originated in these early days of the Church (50).

In the remaining portion of the nave, or in the aisles, sat the faithful who had been baptised, for no others were admitted within the church. Women sat on the one side and men on the other; in one church at Rome, the women occupied galleries over the aisles, but such an arrangement was unusual in the city. Probationers and other worshippers were only allowed in the narthex or in the atrium.



50. S. CLEMENTE, ROME

Great reverence was paid by the early Christians to the remains of the saint to whom the church was dedicated, whose baptistry and font—usually a circular or polygonal building—adjoined the basilica. Commonly, though not at first, the shrine was placed immediately below the high altar, in a crypt or "*confessio*", and pilgrims could descend to it by stairways.

In the later churches we may see how developing ritual occasioned important modifications of the initial arrangements. Originally, the bishop or priest fronted the congregation whilst officiating at the altar, and so that he might face towards the east in so doing, the apse lay at the west end of the church and the entrance was from the east; but in the fifth century a change was made in the manner of service and congregation as well as priest faced east. The orientation of the church was then completely reversed.

In course of time the belief in the efficacy of various saints led to the erection of secondary altars. At first the secondary altars were added on either side of the central recess, in additional apses terminating each of the side aisles; so that, after the eighth century, a "triapsal" arrangement at the eastern end was frequent. San Clemente was one church converted to such a form, but there are numerous other examples.

In the larger churches a more ambitious method of providing the needed extra space was adopted. Rudimentary transepts were interposed between the apse and the nave, taking up the full width of the church. This double-transept or *bema* rose to the full height of the nave and was divided from it by a *triumphal arch*; it allowed room for extra altars, placed sometimes on each side of the apse against the eastern wall, and sometimes at the transept ends. There are two notable instances; S. Paul Outside the Walls (48) and Old S. Peter's, both of them surprisingly early in date to incorporate so advanced a development; they were very important churches and had double aisles. At S. Paul's the bema was divided from end to end by a columned wall, to aid in the support of the roof.

We see, then, in these first efforts of the early Christians, the embryo plan, or arrangement of parts, which afterwards developed into the typical mediaeval cathedral plan. The division into nave and aisles—borrowed from the pagan basilica—is the treatment most widely adopted in buildings for Christian worship at the present day; the influence of the narthex may be traced in the western porches of many cathedral and church plans; the transepts, tentative at first, showed a means of extending the centralised space which in course of time became

universally to be adopted. The atrium, or fore-court, which some of the early basilican churches possessed, was possibly suggested by the similar feature in the Roman patrician dwelling-house; it helped to shut off the sacred building from the outer world, and, as we have said, provided accommodation for those of the worshippers who were not fully qualified to attend the service within the building. In form, though not in position or purpose, it has still survived and is recognisable in the cloister of our western cathedrals. The central fountain of the old atrium, where ablution once had symbolised the cleansing of the spirit, leaves its traces in the holy water stoup of the Roman Catholic Church. The two ambos of the basilicas are represented in modern churches by the reading-desk and pulpit, situated on either side of the choir.

One important development, however, had yet to take place; there was no extension, in the early Christian times, of the fourth—choir—arm of the church plan, converting it into a cruciform shape; that particular modification followed in the Romanesque stage of the historical progress of the mediaeval church. Otherwise, in almost every major feature, the old basilican church of the Early Christians foreshadows the form of the cathedral and larger church of mediaeval times.

The exterior of the Early Christian basilica was treated in the simplest manner possible, with no attempt at architectural embellishment, except at and around the narthex, while the interior depended upon the accessories for its beauty, rather than upon architectural form. The walls inside were rich with veined marbles, and brilliant with mosaic—the most permanent of all forms of decoration, for the golden mosaics of these early basilicas are still undimmed after the lapse of centuries (50). The apse and the triumphal arch—where there was a bema (transept)—were especially rich with pictures worked in these small glass cubes, many of them almost childish in drawing, but all finely decorative, Mosaic had been used extensively by the Romans for floors, but rarely for walls. Byzantine Greeks were responsible for much of the mosaic work in early Christian churches.

Marble patterning, as well as mosaics, was used for floors, but the greater proportion of the beautiful work now to be seen is later than our period. It is of that character known as *opus Alexandrinum*, in which large slices of dark-coloured marbles are surrounded by geometrical interweaving patterns of glass and marble mosaics, inlaid on a base of cream marble. Rich examples exist at S. Clemente, In Rome

and elsewhere in Italy during the following mediaeval periods, this inlay technique was applied extensively to pulpits, episcopal chairs and similar accessories, and often is known as *Cosmato work*, after two thirteenth-century master-craftsmen of that name, though by no means all was actually from their hands.

In many of the earliest Christian buildings is found an odd mixture of columns and capitals, collected from the older buildings of pagan Rome; plain and fluted shafts are placed side by side, Ionic columns contrasting with Corinthian, as in S. John Lateran, Corinthian with Doric; small capitals upon large columns, shafts of different lengths raised upon bases of unequal heights, and so on; for, in Ruskin's words, " the architect of a Romanesque basilica gathered his columns and capitals where he could find them, as an ant picks up sticks "—a heterogeneous collection, sometimes, built up with little intelligent skill, guilty of little architectural style, but brimful of history !

During the fifth and sixth centuries the city of Ravenna, on the Adriatic coast, was second only to the old capital in importance, and witnessed the erection of churches which were hardly inferior to the finest which Rome herself possessed. The principal of these—the ancient cathedral of Ravenna—was destroyed in the last century to make way for a modern building; but, of the other churches, two of the basilican type of especial interest have been preserved—S. Apollinare Nuovo (A.D. 525), and S. Apollinare in Classe (A.D. 549), the latter situated in what was formerly the port, at a distance of three miles from the city.

Externally, their severe brick façades give striking confirmation of our earlier observation as to the structural and decorative austerity of the early Christian buildings. Each church has a bell-tower or *campanile*, a feature of the Italian church which appeared first in the sixth century and became quite common afterwards. In the earlier historical examples, the campanile is completely detached from the body of the church.

The plan of these churches is similar to that of the Roman basilicas; but as Ravenna differed from Rome in possessing few pagan temples which might be despoiled for the adornment of the new buildings, it was necessary that all the details required in the basilicas should be specially worked for the places they were to occupy. Thus in Ravenna one does not meet with the incongruous medley which characterised many of the Christian basilicas of Rome. The features of classical Rome were imitated, but they were subjected to new influences, and

the task of adapting them to the new requirements called forth the best inventive powers of the architects.

A feature of special interest in the Ravenna churches is the *dosseret*, or impost block, in shape like an inverted pyramid, which was interposed between the capital and the springing of the arches—a form in common use with the architects of Byzantium. It was a device by which the seating of the broad wall-arches might be narrowed down sufficiently to be lodged safely on the tops of the comparatively slender, monolithic marble columns. At first simple and almost unadorned, the dosserets became so ornate as to affect the design of the true capitals below, which sometimes was of almost identical pattern (51); in other cases the dosseret ousted the capital altogether, conjoining the two functions in itself.

51. CAPITAL WITH DOSSERET, FROM S. VITALE, RAVENNA

Ravenna at this period carried on an extensive trade with Byzantium, and was subjugated by the Byzantine Emperor Justinian in 537. Thus the presence of oriental details in the buildings can be readily accounted for. But, in addition to these details, there are found in Ravenna entire buildings—to which reference must now be made—constructed upon a plan essentially different from the basilican type. To this style the name of Byzantine has been given, since it originated from the new Eastern capital which Constantine founded at Byzantium.

Byzantine Architecture

We must now return to notice the new development which was taking place while the Christians were erecting their first basilicas in Rome. Intelligent builders in that city were scarce, and architectural styles had become corrupted—a result to which the prevailing practice of destroying ancient monuments and transferring their materials to new buildings for re-use had largely contributed. But, while Rome was languishing, a new era was beginning to dawn for ancient Byzantium, to which Constantine transferred the seat of the empire in the fourth century. Under him the new capital—situated upon the highway of commerce between East and West—grew rapidly in importance. Architecture kept pace with the other developments, but it was carried out under new conditions.

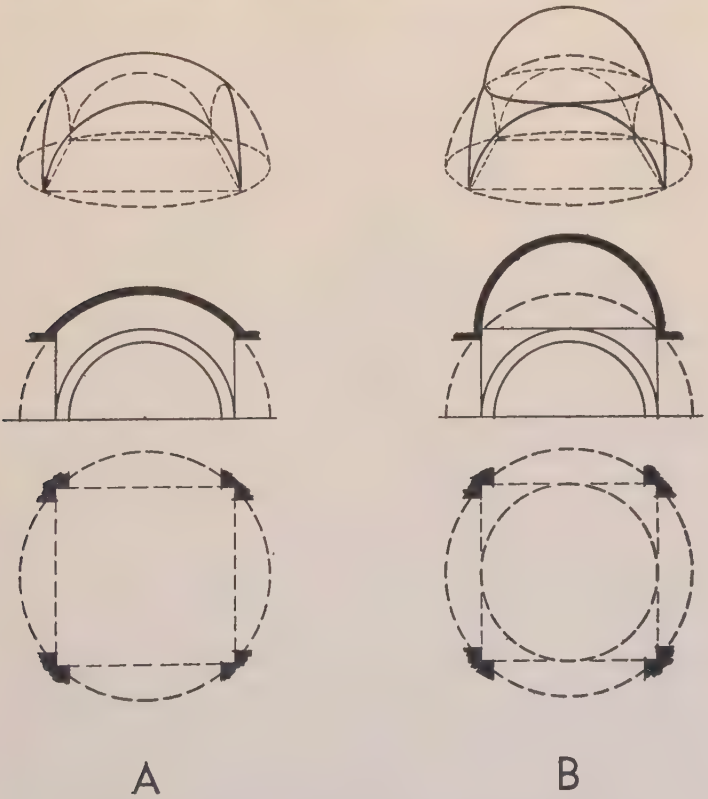
Some of the fundamental principles of construction were adopted from Rome, but many of Constantine's architects, as well as the majority of the artisans he employed, were Greeks or of Greek descent, hailing from Asia Minor and the East, and this was one among several factors which occasioned important changes in architectural style. Byzantium, too, by its trade was brought into direct contact with other nations of the far East, so that there sprang up an oriental taste for brilliance and rich colour decoration, which at once manifested itself in the architecture.

Byzantine architecture represents a fusion of the classical with a near-eastern domical style. Little that the Romans had learnt in the centuries of building experiment was lost in the upheaval of the political migration. Roman skill in organisation, in military, civil and hydraulic engineering and in town-planning was soon made manifest in the colossal works undertaken in and about the new capital; and it was Roman building technique and knowledge of the properties of materials, their command of structure and their magnificent daring in the poise and counterpoise of live, arched masonry that launched Byzantine architecture on its own ultimately independent and adventurous course. The Byzantine Greeks brought as their special contribution their far superior artistic discretion and superb craftsmanship, as well as a new conception of the vault, dependent almost entirely on domical forms. The use of the domical principle, worked out on structural methods modified and further evolved from the Roman, resulted in the resplendent style we know as the Byzantine.

The early Christian builders had diverged towards the elongated rectangle for their buildings, and in so doing, opened the way to the development of the western cathedral church. The Byzantines maintained the more centralised plans favoured by the Romans; yet instead of dividing them into vault-compartments of similar type and size, they built up their domical coverings pyramidically, around a central, single, dominant dome. They could do so because they held a secret denied to the old Romans; that of erecting a dome over a square plan, through the agency of interposed structural elements known as *pendentives*. Roman domes always took the shape of the supporting walls, circular or polygonal; Byzantine domes could be raised over plans of any regular figure, because of this Eastern invention. The pendentive is the key to the Byzantine style.

Typically, the Byzantine dome was carried upon four arches enclosing a square, as shown in the diagram (52), the triangular spaces

between the circular dome and the arches being filled in with pendentives, upon which the dome really rests. It will be seen that each course of masonry forming the pendentives is kept in position by reason of its convexity, so that the dome (simple or compound)



52. BYZANTINE DOME CONSTRUCTION.
DIAGRAMS SHOWING A. SIMPLE AND B. COMPOUND TYPES

rests securely upon the upper course, at the level of the crown of the arches—i.e., upon the four pendentives.

The most magnificent example of the Byzantine style is the great church at Constantinople, built during the reign of Justinian, by Anthemius of Tralles and Isidorus of Miletus, A.D. 532–537, and

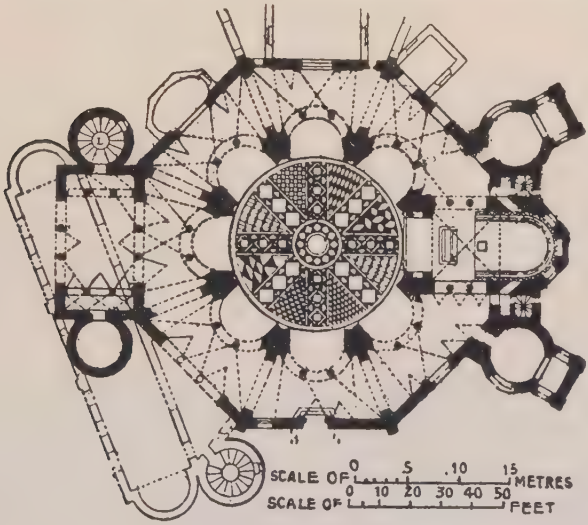
dedicated to Hagia Sophia, the Holy Wisdom, more commonly called the church of Sta. Sophia (43). The main building is roofed over by a great central dome, 107 feet in diameter, lighted by a ring of forty small arched windows ranged round the base. The spaces on the east and west are covered by half-domes, which in turn embrace semi-circular apses. Both the half-domes and the apses are lighted by rings of windows, for upon these roof-openings the whole interior largely depends for light. The weight of the roof is almost entirely carried upon the massive piers which divide the aisles into three bays; so that the whole of the nave, measuring 225 feet in length and 107 feet in breadth, is unobstructed by columns or piers of any kind. This result was obtained by the development along natural lines, of Roman structural principles, suitably modified to incorporate the pendentive and its attendant devices. There is much that is new and original—as a conception Sta. Sophia is quite unique—yet the method of support and abutment, the discriminating use of building materials according to their varying structural capacities, the recourse to brick in light, shell-like but amply buttressed vaults; these are the logical outcome of the Roman train of experiment; whilst the method of assembling the domes and of contriving the window openings within them, not to speak of the superb artistry of the inner decoration, are just as unmistakably the native Greek and near-Asiatic contribution.

The vast nave, roofed over with dome upon dome, culminating in the great central vault; the numerous windows, at all heights, vying with the arcades of arches to confuse the eye and thus enlarge the apparent size of the great hall; the precious marble sheathings of the walls, the rich and delicately carved capitals, and the wonder and wealth of the mosaics, undimmed by the lapse of centuries, with which the vaults are incrusted—these all combine to make the interior of this vast building one of the most impressive and most harmonious of the triumphs of architecture.

The many influences which were at work on Byzantine architecture resulted in a great variety of plans. At Ravenna, for example, where the art of Rome mingled with that of Byzantium, we have seen that in some of the basilicas—e.g. S. Apollinare in Classe and S. Apollinare Nuovo—the Roman type of building was clothed with details of Byzantine character. But other churches differed radically from these. The baptistery of San Giovanni, the surviving portion of a basilica of the fifth century, shows a simple octagonal plan. Octagonal also, but more complicated, is the exquisite church of S. Vitale (53), where the

central dome is carried upon eight piers, between each pair of which is a semi-circular niche or apse; around these is carried an aisle bounded by octagonal walls. In the mosaic churches of Sicily of the twelfth century the Greek artists of Byzantium have left us priceless legacies: the little Martorana Chapel and the Capella Palatina at Palermo, and, in part, the Cathedral of Monreale.

Little attention was paid to the architectural treatment of the

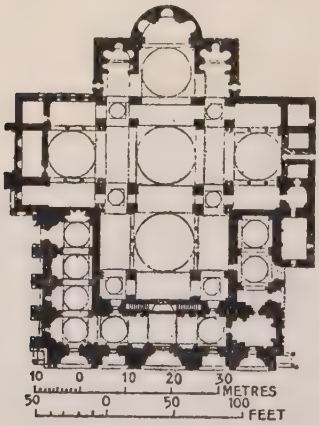


53. PLAN OF S. VITALE, RAVENNA

exteriors; but the richness of the interiors of the churches of the Byzantine style gives them an interest and a beauty hardly surpassed by buildings of any age. The vaulted system of construction which was adopted produced unbroken expanses of wall and ceiling, which were disturbed very little by projections or mouldings—smooth surfaces upon which a decorative effect was gained by means of mosaics. Figure-sculpture and painting had become almost lost arts at this time, and the drawings of the mosaic-workers were rudely simple; but the materials with which the artists worked their symbolical glass-pictures atoned for much that was lacking in the design, and imparted marvellous beauty and splendour to the simple lines of the architecture. The custom—which originated in Rome—of incrusting the lower walls and the piers with precious marbles, and of enriching the floors with

elaborate marble and mosaic pavements, contributed to the general effect of splendour and brilliance.

There was much rich carving also of the marble surfaces. The undersides of the arches and the "spandrils", i.e. the triangular spaces between them, were covered with delicately incised patterns; the capitals of the columns were exquisitely carved in crisp low relief, with symbolical emblems, leaf-decoration, etc., and with incised basket-work patterns. Sometimes the volutes and other features of the Classical architecture of Rome were suggested, but the general form was similar to the illustration on p. 83.



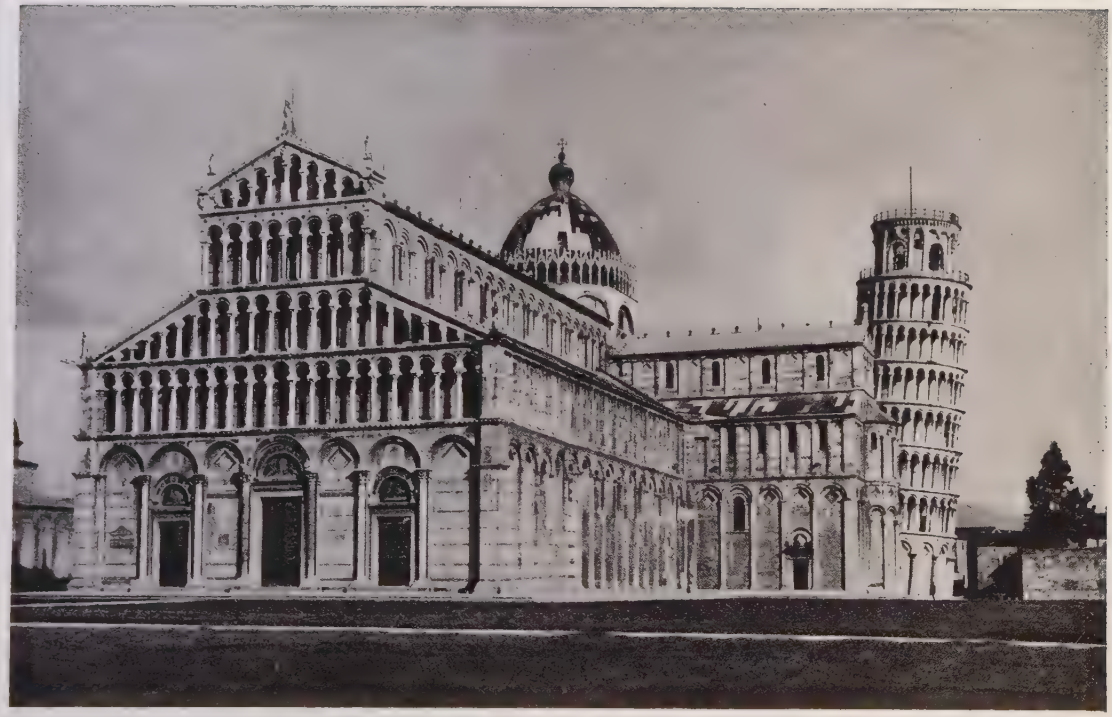
54. PLAN OF S. MARK, VENICE

Above the capital was the impost-block, or *dosseret*, which we noticed at Ravenna—a very familiar feature in Byzantine work, reminiscent of the fragmentary entablature of the architecture of the Romans.

Like the Parthenon in the midst of the architecture of Greece, the great church of S. Sophia remains unrivalled by any building of its class. Further west, the most beautiful result of the influence of Byzantium is the church of S. Mark at Venice. The original church, which stood where S. Mark's now stands, was partially destroyed by fire. Between 1042 and 1071, the structure and arrangement were radically changed and the church was virtually rebuilt, mainly by builders from Byzantium, for, with the exception of minor details of later date, it is purely Byzantine in character. It typifies a second great phase in the history of the style, in which the domical vaults, instead of rising progressively in height to a single great dome, are of equal or almost equal size and are distributed over the four arms and the crossing of a "Greek Cross" (equal-armed) plan (54). Those who have not visited Venice will be familiar, from photographs and drawings, with the form of S. Mark's richly incrusted front, a façade worthy of the picture which Ruskin draws in his "Stones of Venice": "a multitude of pillars and white domes, clustered into a long low pyramid of coloured light; a treasure-heap, it seems, partly of gold, and partly of opal and mother-of-pearl, hollowed beneath into five great vaulted

55. PALERMO CATHEDRAL: THE EAST END

56. S. MARKS, VENICE



57. PISA CATHEDRAL FROM THE WEST, AND ITS CAMPANILE, "THE LEANING TOWER"

porches, ceiled with fair mosaic, and beset with sculpture of alabaster, clear as amber and delicate as ivory. And round the walls of the porches there are set pillars of variegated stones, jasper and porphyry, and deep-green serpentine spotted with flakes of snow, and marbles, that half refuse and half yield to the sunshine, Cleopatra-like, 'their bluest veins to kiss,'—the shadow, as it steals back from them, revealing line after line of azure undulation, as a receding tide leaves the waved sand; their capitals rich with interwoven tracery, rooted knots of herbage, and drifting leaves of acanthus and vine, and mystical signs, all beginning and ending in the Cross; and above them, in the broad archivolts, a continuous chain of language and of life—angels, and the signs of heaven, and the labours of men, each in its appointed season upon the earth; and above these, another range of glittering pinnacles, mixed with white arches, edged with scarlet flowers—a confusion of delight, amidst which the breasts of the Greek horses are seen blazing in their breadth of golden strength."

Though not so imposing a building as S. Sophia, S. Mark's is far superior to it as a manifestation of mosaic (56). The mosaics of S. Mark's do not " adorn " the church, they compose it—they are used, not decoratively, but structurally throughout. All the upper part is composed of curves, no sharp edges nor a correct right angle. " Vaults melt into one another; nowhere is the material broken. We receive an impression of an interior substantially composed of gold."*

Colour, which is the essence of life with orientals, does not enter greatly into the life or architecture of the West. The Byzantine style has had a not inconsiderable, though subordinate influence upon the architecture of Western Europe. It affected the character of the mediaeval architecture of central Italy—and, of course, Venetia—quite notably, and the Renaissance accepted and maintained the pendentived dome as an addition to the Classical decorative system. The domes of S. Peter's, Rome, and S. Paul's, London, can trace their ancestry back to Byzantium. In Greece and Russia the style became, and has continued to be, universally accepted for buildings of the Greek Church, though it has naturally received many modifications. When Constantinople fell into the hands of the Turks (1453), the old architecture was revived, and was applied to the building of mosques, so that it was destined to exert considerable influence upon the building forms of the Moslems.

* L. March Philipps: " Form and Colour."

CHAPTER V

ROMANESQUE ARCHITECTURE

We must now hark back to Italy, where the early Christians were left at work upon their basilicas, and there resume our examination of the architecture of Western Europe from Roman times onwards.

The transference of the seat of government by Constantine to Byzantium (Constantinople), and the consequent decay of the Roman empire, checked intelligent building for a period in Italy. But, as Christianity continued to spread, there was an increasing demand for accommodation on the part of its adherents, and builders were called upon to provide it, first in this town, then in the other. Throughout the Dark Ages—from the fifth to the tenth century—some small amount of building was done, but very little architecture was produced worthy of the name, except in those cities in which, as at Ravenna and Venice, it was developed under Byzantine auspices. Meanwhile, however, the Church was strengthening her authority and broadening her influences, and a new style of architecture slowly developed—with natural modifications arising out of climatic and other local conditions —and gradually spread throughout Western Europe. This new architecture, based upon the traditions of Rome and of the early Christian builders of that city, received the name of *Romanesque*. We shall trace it, under that name, till it flowered into the full " Gothic " or pointed style, the second of the two stages of western mediaeval architecture; for the Romanesque is a round-arched type, like the Roman itself, and is distinguished from its later development principally by this feature. The change from round to pointed arches was fairly generally effected by the year A.D. 1200. We may say at once, that no really important Romanesque buildings, other than those noted as Early Christian, are earlier in date than A.D. 1000.

Although Rome's influence was impressed upon the Byzantine style of architecture as well as upon that which we here call Romanesque, it is desirable to keep one style quite distinct from the other. The two showed marked differences from the beginning; and when the Churches

of Rome and of Byzantium diverged upon questions affecting the ritual and the creed, the divergence became still greater in the architecture of the Eastern and the Western Churches. That of the Eastern Church—the Orthodox Church, so-called—had never departed from the Byzantine models, and the influence of Byzantium has thus spread throughout Greece, Asia Minor and Russia. On the other hand, the Western Church has always looked to Rome for her earliest inspirations and has drawn upon the mother-city for her architecture, though different countries have, naturally, developed their own characteristic features.

To deal first with Italy. During the formative period, which may be said to have ended with the tenth century, architecture—such as it was—was almost entirely ecclesiastical. The basilican churches were the natural outcome of the situation in Rome, where basilicas were to hand to serve as models, and where on all sides Classic temples, with their choice columns and marble wall-linings, were available for the Christian despoiler. But away from Rome other conditions prevailed; materials were necessarily simpler, and greater originality was required on the part of the architects, in order to invest their designs with dignity and interest.

In due course, then, it came about that in Italy three distinct styles of Romanesque architecture were developed: the Basilican, or Early Christian—which, as we have seen, continued to prevail in Rome and neighbouring parts of central Italy; the Lombard; and the Tuscan. There was a hybrid style, also, in southern Italy and Sicily, at which we shall give a passing glance: Venice and Ravenna already are accounted for as coming largely within the Byzantine sphere of influence.

The Lombard-Romanesque, as the name denotes, flourished chiefly in the cities of the Lombardy Plain, in the north of Italy, from Milan on the west to Bologna on the east. These two cities, and their neighbours, Piacenza, Verona and Pavia, all contain good examples of the style in S. Michele (Pavia), S. Zeno (Verona), S. Ambrogio (Milan), the cathedral of Piacenza, and others.

Before considering these regional Italian Romanesque styles severally, we must pause to note one important new trend evidenced in certain of the churches of the period taken as a whole. In the instance of such as S.M. in Cosmedin (A.D. 795), the usually continuous arcades are interrupted by solid piers at regular intervals. The intention was to stiffen the slender nave walls. This development, though slight, is significant, for it represents the first step towards the complete vaulting

over of the mediaeval church, an objective of first importance, in view of the ever present danger of fire, which records show to be frequent and often disastrous. At S. Miniato, Florence (A.D. 1013), the nave arcades are not only so divided, but transverse arches are thrown right across the church, nave and aisles alike, thus bracing the four longitudinal walls firmly together (60). Another, but indirect, advance, is

58. WEST FRONT OF S. ZENO, VERONA

accomplished in Pisa Cathedral (1063–92) where the double aisles are everywhere vaulted, though the nave roof is in timber. This great church is basilican in type, yet has fully developed transepts—each with its own two aisles—and an extended choir arm, inserted between the apse and the transepts. Here, then, are all the main elements of the fully developed " latin-cross " plan, which from about this time onwards became common to all Western European major churches.

The tale of vault development is taken up in S. Ambrogio, Milan, (1140 is now the usually accepted date for the vaults, but they may have

been built 40 or 50 years earlier), which has " high " vaults over the nave, as well as vaults over the aisles. Even this completely vaulted church does not represent the final solution to the mediaeval builders' problem, for it is almost windowless on the flanks. Such, briefly, is the story of Italian Romanesque experiment in vault construction. Meanwhile, as we shall see, other experiments, more progressive as it proved, were proceeding in France and England. We must now return to look at the distinctive regional traits of the main kinds of Italian Romanesque.

The old church of S. Zeno at Verona, begun in 1138, shows many characteristic features (58). The façade is simple in composition, with a fine breadth of flat surface, relieved only by a series of regularly-spaced, shallow pilaster-strips, running the full height of the front, and by a horizontal band of small, deeply-shadowed paired arches, standing on small, slender columns. Projecting arcaded corbels emphasise the sloping lines of the gables. The façade expresses the nave-and-aisle disposition of the interior, a shape which the builders of the day found difficult to treat decoratively; in other examples, as at twelfth-century S. Michele, Pavia, the lower side aisles are masked by the unbroken continuation of the sloping lines of the gable of the central part. A rose-window occupies the space under the centre of the gable at S. Zeno, and beneath this a projecting porch marks the doorway. The columns of the portico rest upon the backs of crouching lions—familiar features to all who have visited the old cities of Lombardy. Elaborate, quaint carvings enrich the entrance, and atone somewhat for the severe treatment of the upper portion of the front. The façades were always solemn and dignified, and, with their aspiring slender shafts and sparingly disposed " blind " or windowed arcades, relied upon the crisp Italian sunlight for relief and for vigorous effects of light and shade; else they were inclined to gloominess and severity. Tennyson, visiting these cities under a dull sky, noted how:

> Stern and sad (so rare the smiles
> Of sunlight) look'd the Lombard piles;
> Porch-pillars on the lion resting,
> And sombre, old, colonnaded aisles.

In connection with many of the churches, as at S. Zeno, Verona, and the cathedral at Piacenza, was found a square *campanile* or bell-tower, simple in form and always well-proportioned.

The extension of the eastern arm of certain of the church plans led to the development of new devices for lighting the central part or

" crossing " of the churches, and arcaded cupolas or " lanterns " were erected there as, for example, S. Ambrogio, Milan, and S. Michele, Pavia. Such cupolas usually were covered by octagonal domes; a survival of Byzantine influence. Italian mediaeval architecture developed little beyond that point; in the northern Romanesque—where the campanile was popular—central towers, and twin western towers too, developed rapidly, and, eventually, became the crowning glory of the Gothic church in Britain.

Internally the plan of the Lombard churches was much modified from the original basilican arrangements, for in most instances, the arcades were disposed in alternately large and small clustered piers, prepared for massive vaulting, which sometimes—as at S. Zeno—was not actually carried out. There is a consequent further general reduction in the span of the naves, for the Romanesque builders rarely attempted to parallel the feats of the Romans and Byzantines in bridging great spaces; several of the more important Early Christian, wooden-roofed basilicas came near to 80–90 feet spans commonly achieved by the Romans, but somewhat less than 40 feet is the average dimension for the naves of western Christian buildings, Romanesque or Gothic. Some among the Lombard churches had a crypt and shrine beneath the choir, the floor of the choir being raised a few steps above the general floor level.

The Tuscan-Romanesque was not unlike the Lombard, modified by the different social conditions which existed in Florence, Pisa and the neighbouring cities of Tuscany. The finest examples are found at Pisa, where the Romanesque buildings in the Cathedral Square—the cathedral (A.D. 1063–92), the baptistery (A.D. 1153–1278, with Gothic additions of the fourteenth century), and the leaning tower (A.D. 1174)—form one of the most interesting architectural groups in Italy (57).

The Tuscan designs are lighter and more elegant than those of the northern cities. Except in the case of Pisa Cathedral, where there were vaults over the aisles, timber ceilings were adhered to, in connection with the basilican forms, permitting the use of columns instead of piers for the interior nave-and-aisle divisions. The façades were almost entirely covered with a lavish arrangement or wall-arcades and galleries, as seen in the Pisan buildings; or they were divided into panels of dark and white marbles, as at S. Miniato in Florence. The arcading was highly decorative, the tendency to become monotonous being in most instances averted by skilful and varied treatment of the different tiers. The tower at Pisa forms an exception, for the constant repetition

of bands of arcades of almost equal height, from the base to the summit impairs the attractiveness if not the interest of the building.

Tuscan-Romanesque was influenced quite a little by the Byzantine methods of building and of decoration, for Pisa was a port maintaining an extensive trade with Byzantium. This fact accounts for the use of the marble panelling, which became characteristic of Florentine architecture, and influenced that of the later Gothic period (84).

Lucca and Pistoia, neighbours of Florence, have good examples of the Tuscan style; and in many parts of Italy churches were erected to which the generic term Romanesque may be applied, in which were blended the methods and traditions of the Byzantine, the Lombard, and the Tuscan builders.

In Sicily, the rule of the Mohammedans, which began A.D. 827, and that of the Normans which succeeded it, somewhat before A.D. 1190, left their impress upon the island's architecture, so that we find Arabic and Norman influences mingled with those of Byzantium and Greece. The beautiful cathedral of Monreale near Palermo (A.D. 1175), has a basilican plan—though with a western porch, framed between twin towers, and a developed, triapsal end—and reveals a picturesque mixture of the different styles. The nave columns have finely carved capitals of the distinctive Byzantine form with the *dosseret* supporting pointed arches. A dado of white marble lines the lower portion of the walls, above which they are richly incrusted with mosaics representing Biblical stories. The timber roof is somewhat elaborate, and is richly treated with colour decoration, after the manner of the Mohammedan interiors.

Palermo Cathedral, another fine Arabo-Norman building, was founded in 1185 by an English Archbishop, Walter of the Mill (Gualterio Offamilio). Though frequently restored—the dome and the interior are eighteenth century work—externally, the family likeness to the work of other adventurous Normans in far-off England, as, for instance, Durham Cathedral, is quite clear to see (55).

During the first ten centuries of the Christian era architecture made little progress in Europe, outside of Italy and of the eastern countries which came more directly under Roman influence. Spain alone, in the West, had become a flourishing centre of the art, thanks to the incursion of the Moors. Throughout this period society in Western Europe was in a state of chaos; lawlessness was rife, and progress in architecture or in any of the fine arts was impossible. The church alone, as an institution, showed some little vitality, for within its

monastic walls prevailed a peace which was unaffected by the external turmoil and unrest. Building on an extensive scale was, moreover, checked by a very widespread belief in the theory of the impending end of the world in the year 1000; but this check was a temporary one, for the fear of the dread event led many an uneasy conscience to contribute liberally to the monasteries, or to seek refuge in them; the new century, therefore, found these institutions wealthy and powerful as they had never been before. A period of great activity ensued, and architecture at once began to make considerable progress in all directions.

Almost all the new buildings of importance were ecclesiastical, and the builders naturally looked to Rome as their centre and their source of technical help and inspiration. But, to many, Rome was a far-off country, and the new occasions taught new methods and devices which soon made the term Romanesque a very comprehensive title, for, as has been said, under this head may be conveniently classed almost all the round-arched mediaeval work throughout the west of Europe before the introduction of the true Gothic, and which in England culminated in the " Norman " buildings of the eleventh and twelfth centuries.

The architecture of each country, governed by local conditions and traditions, was marked by its own distinctive features, but showed at the same time a general similarity of style. Almost all the buildings were constructed with the same object, and it became a question of solving the same problem in different ways—the problem, namely, of combining the vaulted roof construction with the basilican plan, and at the same time admitting sufficient natural light. The earlier Christian builders needed more window space than we do to-day, for glass being rare, it was fitted in small fragments in stone or wooden lattices, or alternatively, translucent marble slabs were used; many former windows in Italian buildings have since been blocked up. The invention of leaded glass, whenever it first occurred, (probably in the later eleventh or early twelfth century) must have been warmly welcomed. The window problem was intensified in the more northerly countries where the climate is dull and the quality of the light poor, and this fact undoubtedly spurred French and English designers to more spirited endeavours than they might otherwise have made. The Lombards had built wholly vaulted churches by about the middle of the twelfth century, but the windows, except sometimes at gable ends, were very small. It is no accident that French and English builders were the first to solve the double problem effectively.

59. ABBAYE-AUX-HOMMES (S. ÉTIENNE), CAEN, NORMANDY: SHOWING SEXPARTITE VAULTS

60. THE CHURCH OF S. MINIATO, FLORENCE: SHOWING THE EAST END ELEVATED OVER THE CRYPT

From Gailhabaud, " Monuments Anciens et Modernes ", 1850

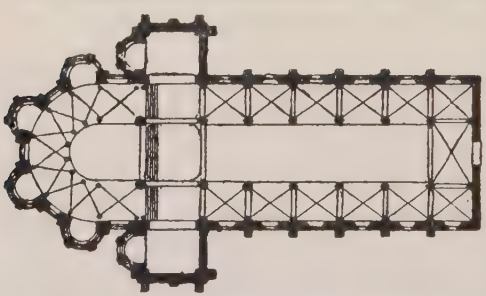
61. DURHAM CATHEDRAL. THE NAVE, LOOKING EAST

The tremendous problem then, before the Romanesque builders was how wholly to vault the developed cruciform church, organised on the clerestory principle throughout, without diminishing in important degree the useful spans or the natural light afforded by the timber-covered structure so far evolved. The high vaults presented the greater difficulty—aisle vaults in small spans were almost continuously in use from Roman times—for to poise great masses of masonry high in the air and at the same time to maintain the clerestory lights unimpaired raised vast difficulties of abutment and support which admitted of no easy solution. Many experiments were tried, some, especially in south and central France, extremely ingenious, but all had some defect of convenience or appearance until the introduction—in the twelfth and thirteenth centuries—of *ribbed* vaulting, which, with the pointed Gothic arch, revolutionised the conditions of construction, and gave the builders a happy and complete solution of their problem. What is called "Gothic" architecture is in reality nothing more than the logical outcome of the progressive Romanesque; the transition is a natural one, just as, in English architecture, is the transition from the round-arched Norman to the pointed style of the thirteenth century. The name "Gothic" is an unfortunate one, for readers are apt to regard it as a foreign and distinct style, breaking in upon, and interrupting the continuity of, the architecture of the period. It is only by following the Romanesque architects in their constructive difficulties with the round arch that we are able to appreciate what the Gothic principles did for their architecture, and the extent to which they enlarged its scope.

FRANCE.—To return now to France. In the Romanesque buildings of this country may be traced the results of various influences. Many of the southern churches possessed marked Byzantine features, the outcome of a very considerable trade which was carried on between the ports on the south coast, Venice, and the east. In the church of S. Front at Périgueux (A.D. 1120), the plan strikingly resembles that of S. Mark's, Venice; the interior is roofed over with domes in a similar manner, and these show externally too, but the domes of S. Mark's were covered with separate false domes, at a higher level, in the thirteenth century. The interior of the building is finished in stone, with none of the rich interior decoration of the Venetian church. At Cahors is a domed cathedral of the same date strongly resembling a church in Byzantium. In Provence especially, the designs were influenced by the many Classic Roman buildings surviving there, as for

instance those found at Nîmes, Arles, Avignon, etc. In the churches of Notre Dame at Avignon, and S. Trophime at Arles, we find Corinthian capitals, pilasters, enrichments, and other features borrowed directly from the Classic models.

Auvergne contains some excellent examples of Romanesque churches, built of the lava of this well-known volcanic district. Let us consider the church of Notre Dame du Port at Clermont-Ferrand, an excellent and typical example of the style. Lava is used in the construction, and some effect is gained by the use of lavas of different colours. The plan of this church (62) shows a long nave covered by barrel vaulting, with small transepts and an apsidal end. Round the apse is carried a series of small apsidal chapels. This arrangement is called a *chevet*, which became an essential feature in French cathedral plans. Such a group of small chapels, ranged round the end of a lofty cathedral, produces a singularly interesting and dignified interior effect. The feature was introduced by the Romanesque builders, and probably originated in the Auvergne district, where it is found in the Romanesque churches at Issoire, Le Puy, Clermont-Ferrand and elsewhere. The Gothic architects retained the *chevet*, so that it figures in the plans of most of the great French cathedrals of that period.

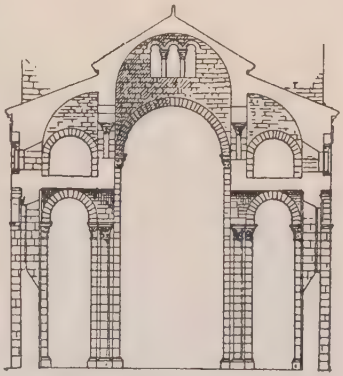


62. PLAN OF NOTRE DAME DU PORT, CLERMONT-FERRAND

Notre Dame du Port is representative of the whole group of Auvergne churches too, in another important particular. It illustrates one class among the partially successful attempts to meet the problems connected with the high vaults—referred to earlier. The solution offered here was very simple in idea (63). A masonry " barrel " (semi-cylindrical) vault covered the nave from end to end. It rested on strong, regularly-spaced, clustered piers, and the oblique outward thrusts of the vault—which, because of the great weight of the solid vault, were severe—were countered by continuous quadrant vaults on either side, over the aisles, these enclosing an upper, " triforium ", apartment. The backs of the vaults were filled out with masonry to make regular slopes, and roof coverings were laid directly on these. Here, then, the vaulting of

an entire church is quite definitely achieved: but there are two serious faults; one, that the span of the nave has been reduced much below that readily practicable in a wooden-roofed church—in the parallel example at Issoire the span is scarcely twenty-five feet—and, two, the tiny windows at the base of the buttressing vaults are too low down and inadequate to light the upper parts of the nave. In some examples, also with barrel-vaulted naves, as at Autun (A.D. 1090–1132), clerestory windows were introduced, the nave vault being raised sufficiently high for the purpose above the roofs of the side aisles; but the constructive methods were not equal to the task, for in almost all cases the vaults gave way and required to be reconstructed.

Towards the end of the twelfth century the use of flying buttresses to resist the lateral thrusts made it possible to combine clerestory windows with barrel vaults; but the difficulty was not satisfactorily surmounted until the introduction of groined vaults in the thirteenth century.



63. SECTION THROUGH NOTRE DAME DU PORT, CLERMONT-FERRAND

Issoire Cathedral, among the Auvergne group, shows the method adopted by the French Romanesque builders of lighting the crossing of the church by raising it and neighbouring parts of the transepts above the chevet to allow of clerestory windows on the east and west walls.

We cannot take leave of the Romanesque buildings of France without touching upon the works of the great Norman Dukes—so intimately connected with the architecture of our own island.

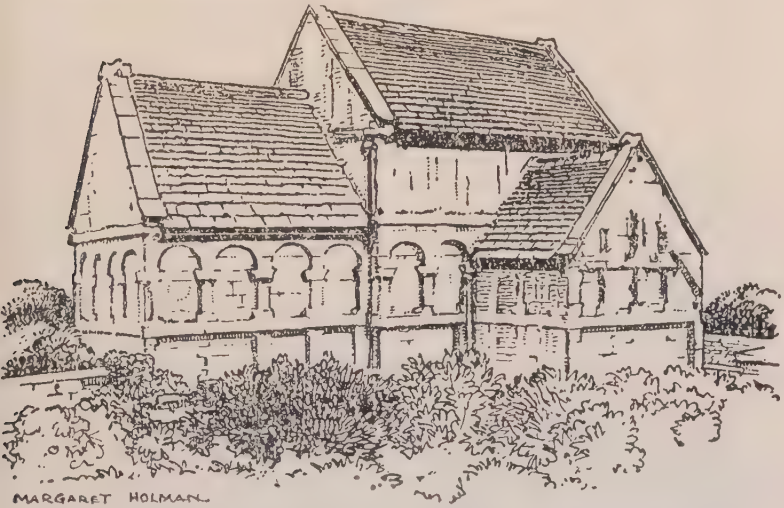
The best known example among the abbey churches of Normandy, and one of the noblest buildings of the time, was the Abbaye-aux-Hommes, or S. Étienne, at Caen (59), begun in 1066 by William of Normandy—better known to us as William the Conqueror—in commemoration of his victory at Hastings. The church is lofty in its proportions, with vaulted nave, aisles and transept. Its east end was originally in the form of a simple apse, but this has been superseded by the *chevet*; the west front is finely proportioned and is flanked by two towers, between which the nave rests. The spires which crown the towers are later additions. The system of vaulting is of surpassing

interest as illustrating the final accomplishments of the Romanesque builders' main problem, if yet in a somewhat clumsy and inexpert way (59). The vaults begin sufficiently low down to allow of their being buttressed as well as supported by ponderous walls, and additional resistance to their outward thrust is given by some rather trivial buttresses underneath the *triforium* roof. The triforium, we have seen, is the compartment under the aisle roofs, usually having openings into the nave of the church; so that inside the church there are three tiers, a nave arcade, a triforium gallery, and a clerestory. The clerestory windows are cleverly contrived within the base of the vaults, by a combination of devices, some of which had been used in earlier Romanesque building elsewhere. The principle used depends upon the " cross-vault ", in which one short length of barrel vault intersects another short length, at right angles, so as to form a square compartment or " bay ". Multiplying such bays down the nave, each is made to correspond with two smaller but similar bays over the aisles, and the piers of the arcades consequently alternate in two sizes to accord with the differing loads they are called upon to bear. But the vaults are not of homogeneous concrete like the Roman; they are built up in separate stones, between the skeletal ribs which frame each bay, the ribs similarly made up of separate stones or *voussoirs*, like the units of an arch. Three kinds of ribs make up the frame; " wall ribs ", " transverse ribs " and " diagonal ribs ", the latter following the groin of the intersecting short barrel vaults. A simple ribbed vault of this character is known as " quadripartite ", since the diagonal ribs divide the bay unit into four compartments. English vaults, as we shall see, are of the quadripartite kind, but at Caen—and quite commonly in France until the early thirteenth century—they are " sexpartite ", for there is an additional transverse rib in each bay corresponding with the minor piers as well as with the major. This extra rib occasions some structural complications in the vault, as may be seen from the illustration, but in a round-arched vault, it helped to give support at the point of intersection of the diagonal ribs, where the vault is flattest and weakest.

The Caen vaults, then, are of an advanced type, which is all the more remarkable considering that they may be earlier than the vaults of the most advanced of the Lombard churches, those of S. Ambrogio, Milan, on which they nevertheless improve in providing adequately for natural light. (S. Étienne vaults date from c. 1130. The Milan vaults are assumed to be c. 1140). The span of the Caen church is moderately large—about 33 feet. The chief principles of sound vaulting are here

firmly established and we are but one step from the threshold of the Gothic, the advent of which is marked by the use of the pointed arch, destined to make vault construction so much the more flexible that a whole new field of opportunity was opened up.

Of equal interest is William of Normandy's other great building, the Abbaye-aux-Dames, or La Trinité, at Caen (1062–6), which is similar in all important respects. These are but two of the more important of Normandy's fine series of church buildings.

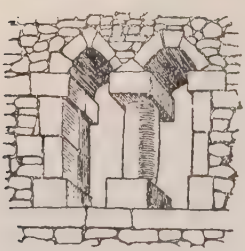


64. THE SAXON CHURCH OF ST. LAWRENCE, BRADFORD-ON-AVON

ENGLAND.—The inhabitants of Great Britain appear to have made very little progress in architecture before the Norman conquest. Prior to this the most important building work was done by the Benedictines, to which Order belonged all the older monasteries in England—among others, the Benedictine Monastery which preceded Westminster Abbey, founded by S. Dunstan (A.D. 960). At Canterbury, excavations which have laid bare the floor and western front of S. Augustine's original Abbey Church reveal to us what is probably the earliest plan of a Benedictine church in Europe. Numerous churches were erected by the Saxons and the Celts, but the remains are sufficient only to prove that these early builders—of the Anglo-Saxon period—were endowed with little technical skill. The tower of Earl's Barton, in Northants, and the little church at Bradford-on-Avon (64) are perhaps the best

existing examples of the work of the Saxons. The rare occurrence of Saxon remains at the present time is probably due to the fact that, with the advent of the Normans, the ruder primitive buildings were destroyed to make way for the new style which swept so rapidly over the country. Possibly, too, the generous use of wood in the construction led to decay. Timber was the prevalent material among the earlier Saxons, and its use appears to have influenced the details of their later stone work. Their triangular headed window openings and " turned baluster " window mullions (65) are certainly suggestive of timber construction.

Before the landing of William the Norman, the influence of the Normans was beginning to make itself felt, for—England's insular position notwithstanding—it was impossible that the country should be unaffected by the art which was making such gigantic strides within a few miles of its seaboard. The Norman conquest (1066), and the subsequent occupation of the country by the barons and ecclesiastics of Normandy, effected a rapid social revolution, and speedily transformed the political organisations of the island. As an immediate result of the change there set in a period of extraordinary activity in the building of churches, abbeys and castles, by means of which the invaders were enabled to establish themselves more securely upon the lands plundered from the conquered Saxons. Many churches were founded by the Norman himself, while his followers vied one with another in their efforts to surpass all that had been seen on the other side of the Channel.



65. SAXON WINDOW, WORTH, SUSSEX

The Romanesque, or—to use a more familiar term—the *Norman* period, during which the architecture imported by the invaders prevailed in England, lasted for a little more than a century—i.e. from the conquest until the accession of Richard I., in 1189. Between these dates building operations were carried on throughout England with almost incredible activity. Not only in many of our great cathedrals do we find extensive remains of Norman work, but in a vast number of churches in every part of the country fragments and details are found, pointing to the fact that a complete Norman structure once occupied the site, from which almost every trace of the original work has disappeared. It has been computed that no less than 7,000 churches were built within a century after the conquest.

The Romanesque, or " Norman ", cathedral of England is marked by features similar to those which characterise the Romanesque buildings of Normandy. Its general appearance is sturdy, with solid walls, cushion-shaped capitals,

> Massive arches, broad and round
> On ponderous columns, short and low.

Compared with its Continental prototype, the typical Norman cathedral such as that of Durham or Peterborough, is longer in proportion to its width, the length being especially marked in the choir. A square east end, though with an apse, takes the place of the *chevet* of French cathedrals, and the transepts are more important. A great central tower, carried over the crossing of the nave and transepts, is also characteristic of the English plan.

Internally there was generally the intention—suggested by the massive piers and columns—to vault over the aisles and the nave, though through lack of funds or other considerations, the vaults were infrequently completed. Flat, low-pitched roofs and wooden ceilings were substituted; and as these were light and easily supported, the builders were able to insert large clerestory windows, and to secure light and lofty effect at moderate cost. The wooden roofs, however, were liable to injury from fire and, in many instances, were burned or destroyed.

The supreme example of Norman work in England is Durham Cathedral (1), as superb in its architectural qualities as is its advanced structural technique. It had a widespread influence in its own day. It still is substantially intact and entire, with most of its original vaults. In arrangement, Normandy models are followed closely, but improved upon in many important particulars. As was normal procedure, the choir was built first, so that the community of Benedictine monks might have a place of worship with the least possible delay. Begun in 1093, the vaulted choir, buttressed at its western end by the crossing and neighbouring portions of the transepts and nave, was completed by 1104. (The vault over the choir lasted about one hundred years and then had to be replaced, owing to the development of grave faults.) A lapse of funds occasioned a temporary recourse to wooden roofing over the south transept, but the north transept, again with a vault, was finished in 1110. This second vault has survived to our day and is probably the oldest surviving ribbed *high* vault in the country, if not in Western Europe. It is of generally similar type to those at Caen, but precedes them in date.

The rest of the church occupied the builders until 1133. In this work, the vaults over the nave (61) embody the all-important innovation; the transverse arches are slightly pointed and reach to the same height as the diagonal ribs, which are semi-circular, so as to maintain a level crown throughout the length of the nave. The level crown, incidentally, is a feature of English vaulting, in contra-distinction to continental mediaeval practice, where each of the bays is slightly domical. Walls everywhere are ponderous—seven feet thick is the average—and support and buttress the vaults on the same principles as at the chief Caen churches; though the bays at Durham are double quadripartite, not sexpartite. " Flying " buttresses are concealed by the triforium roofs; they are not strong enough, alone, to counter the thrusts of the vaults; the weight of the thick walls does most of the work in Norman church design. These triforium buttresses have been strengthened in recent times.

The details of our Norman churches, with few exceptions, are extremely simple; they are seen in their simplest form in the little chapel of S. Mary, at Stourbridge, near Cambridge. The piers were often perfectly plain and round, as at Gloucester; sometimes clustered, as at Peterborough; or, as at Durham, clustered and round piers were used alternately. Doorways were simple in outline, circular-headed, and with little of the added ornamentation which appeared in the gables of the later Gothic entrances; richly carved capitals decorated the clustered columns of the opening, and a profusion of carving covered the arch-mouldings. The design showed little variety; the zig-zag ornamentation, easily shaped with the axe, occurred with endless repetition, varied occasionally by the well-known " bird's-beak " moulding, familiar to the most casual observer of Norman work.

Norman carvings always were done on the ground before erection; and as the stones usually varied somewhat in size and it was the practice to carve a unit of the decorative ornament on each stone, there were some quaint irregularities in the work. The quality of Norman carving degenerated a good deal in the second half of the twelfth century; yet there is a surprising delicacy and refinement in the Gothic work early in the following century, perhaps due to the fusion of the Norman and Saxon peoples into one race, for the Saxons were of high intellectual and artistic ability in relation to their time.

Window openings were treated more simply than doorways, but were sometimes enriched with the zig-zag, as at Iffley Church, near

Oxford, and occasionally with interlacing arches, as at Castle Rising Church. The cushion-shaped Norman capitals, suggestive of the sturdy echinus of the Greek Doric column, were usually left quite plain, though the Norman mason at times took pleasure in carving quaint devices or grotesque faces upon the caps, or upon the projecting stones of the "corbel tables" frequently used near the tops of the walls outside.

CHAPTER VI

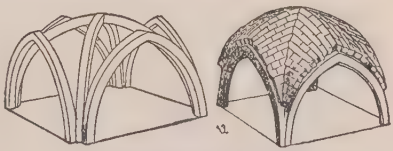
GOTHIC ARCHITECTURE

THE Romanesque architects, as we have seen, had made great progress in the art of building by the middle of the twelfth century, and had mastered most of the problems which had puzzled them at the outset. After innumerable trials on the Continent —the centre of progressive experiment traversing northwards and westwards meanwhile—the Normans, in France and in northern England, had evolved a method by which churches might be vaulted and yet have good windows to light the whole of the interior. The vaults gave protection against the spread of fire, a great scourge in the Middle Ages, when fire-fighting appliances were of the most elementary kind. The presence of the vaults controlled and modelled the entire structure, for the massive walls had to be kept in place, strongly supported and heavily buttressed at all vital points. In the Romanesque system, like the old Roman, walls and vaults were very thick and weighty, and there was the further similarity that both systems employed the vault-rib; but at that point correspondence ceased. The Roman ribs were of brick, solidly embedded within a concrete mass, and had the purpose of resisting strains in the vault as a whole; whilst the Romanesque builders used a scientifically constructed rib-frame of stone units, built independently of the panel infilling, which followed later, as a separate process (66). The weight of the panels, or "webs", passed to the ribs, and from the ribs was concentrated at points of support immediately above the piers of the nave arcades. The Romanesque rib-frame represented a new principle—a principle which brought about nothing less than a revolution in the art of building, and which, in fact, formed the structural basis of the style of architecture known as "Gothic".

The full advantages of the new principle could not be secured at first, for so long as the round arch was retained for the rib-frame, there were perplexing difficulties of detail to be overcome, due to the fact that as the diagonal rib had a greater distance to span than the wall and transverse ribs. The webs would be awkward to construct if all the

ribs were made semi-circular, or, if the vault crowns were kept level, the diagonal ribs would be of a dangerously shallow elliptical profile. The use of the pointed arch, as introduced at Durham Cathedral, provided the solution, and thereafter, the Gothic builders were enabled to concentrate on perfecting the principle, progressively lightening the weight of the vaults and, with rapidly developing skill, poising the whole on slender clustered shafts, secured against collapse by well-placed, compact buttresses. Architecture acquired the new quality of *energy*, as distinguished from that strength in repose which characterised the old Roman and Romanesque.

The term Gothic is as unfortunate as it is inapt. Gothic architecture is the natural outcome of Romanesque, though the term seems to suggest a break in the progressive character of the art, and has doubtless proved a stumbling block to many students, by leading them to regard the styles as distinct from, and possibly opposed to, one another. "Gothic" was merely a contemptuous term applied to the style by the Classical enthusiasts of the Renaissance, who looked upon a Goth as a typical barbarian, and who regarded anything non-Classical as barbarous; but the name has stuck, as bad names have a habit of doing, and is still in general use to denote the pointed style which developed in the twelfth, and flourished in the succeeding centuries. The pointed arch, it should be noted, was in reality incidental to the development of Gothic, though it is usual to consider it the characteristic feature of the style.

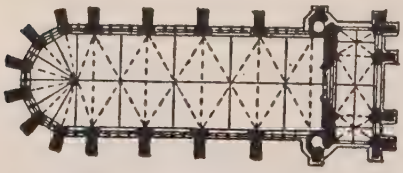


66. RIBBED VAULTING

In ribbed vaulting as observed earlier, a skeleton vault is formed of ribs carried transversely and diagonally across the nave, so as to form a strong open framework, and to concentrate the weight and pressure of the roof upon the isolated points of support from which the ribs spring, the spaces between the ribs being then filled in with lighter masonry. The advantages of this form of construction are readily seen; the roof became lighter, and could span larger areas; and, as the pressure was concentrated upon certain points, it was necessary only to strengthen the wall at these points, instead of making it thick and massive throughout. Buttresses were introduced for this purpose; and as the wall between the buttresses, relieved from the pressure of the roof, became now of secondary importance—for it was merely a screen to keep out the weather—it could be constructed of light

materials, or opened up in the form of windows. With this innovation, then—the application of the principles of *concentration of stresses* and of *balanced thrusts*—the Early Gothic builders took up the constructive problems just where the Romanesque builders left off, and soon added fresh dignity and grandeur to this work.

Let us see to what extent these new principles affected design and construction. The illustration (67) shows the plan of a highly developed Gothic building of simple form, Sainte Chapelle, in Paris, built by Louis IX (1243–1247). The upper chapel here is an unbroken room, 100 feet in length, 33 feet wide, and 60 feet in height, roofed over with a series of cross-vaults springing from slender columns. The thrust of the columns is taken by buttresses—very sturdy, as we see in the plan —and carried up the entire height of the exterior walls. Now note that the massive walls which would have been necessary to support such a superstructure in Romanesque work, have disappeared. The wall lengths between each vault have, so to speak, been turned round upon their axes, and placed at right angles to their original direction, so as to form a series of buttresses, with abutment sufficient to withstand the thrust of the ribbed roof-vaulting. These wall spaces between the buttresses are no longer required for constructive purposes, and can therefore be filled with large windows, destined soon, as a natural further development, to become rich with the glories of stained glass.



67. PLAN OF SAINTE CHAPELLE, PARIS

In a design such as Sainte Chapelle, a Gothic church without aisles, the problem of dealing with the thrusts is presented in its simpler form, as the walls which take the thrusts are *external* walls. But when aisles are introduced at the side of the nave, a fresh difficulty arises. The buttresses cannot now be carried vertically down, for they would block up the aisles with their mass. To permit of their being ranged along the external face of the aisle-walls, a new feature is brought into play—the flying buttress, which bridges over the intervening space, and supplies at once the necessary counter-thrust to the roof-vaulting of the nave. As the nave piers and the walls over them are now relieved, by the buttresses, of the more serious part of their burden, and have to perform only the simple task of carrying the vertical weight, the builders are enabled to make them not only lofty, but slighter and more graceful.

The flying buttress, then, soon became a characteristic feature of Gothic building (72). True, its necessary presence hampered the exterior design in some respects, but its decorative possibilities were speedily recognised and seized upon. So ornate and ornamental did it become that in many French cathedrals it has the appearance of being a purely decorative feature, placed in its position for no other reason than to delight the eye and to endow the design with grace, and with that suggestion of aspiration—rather than repose—which is inseparably connected with true Gothic:

> The Grecian gluts me with its perfectness,
> Unanswerable as Euclid—self-contained;
>
> But ah ! this other, this that never ends,
> Still climbing, luring fancy still to climb,
> Imagination's very self in stone.

While the buttress enabled the builder to introduce height into his design as one of the chief elements of effect, the pointed arch solved the difficulty of bridging over varying widths at any required height. The Gothic architect could thus give play to his fancy and imagination confident in his ability to solve all problems of construction, and unfettered by considerations of precedent.

The Gothic cathedral has been styled " a roof of stone with walls of glass," and not inaptly; for the walls, no longer required to be of massive construction to carry the weight, became little more than screens, either of masonry or of glass, filling in the spaces between the buttresses, to keep out the weather and to give effect to the design; and no treatment of these spaces could secure so glorious a result as did the introduction of great traceried windows filled with richly coloured glass. So beautiful was the painted glass of the period that it at once made its influence felt upon the architecture; the windows were increased in size, and the walls, as far as possible, were illuminated. " Far more important," remarks Fergusson, " than the introduction of the pointed arch was the invention of painted glass, which is really the important formative principle of Gothic architecture; so much so, that there would be more meaning in the name if it were called the '*painted-glass style*' instead of the pointed-arch style. . . . We must bear in mind that all windows in all churches erected after the middle of the twelfth century were filled, or were intended to be filled, with painted glass, and that the principal and guiding motive in all the changes subsequently introduced into the architecture of the age was to obtain the greatest possible space and the best localities for its display."

The extensive use of glass soon led to a great development of another feature—window tracery. The nature of the glass required that the window areas which it filled should be divided up into a number of smaller spaces, for it was comprised of a mosaic of painted fragments, arranged to form transparent pictures, but secured one to the other with lead strips. The leaded glass would have collapsed of its own weight had it not been wired to metal horizontal bars, these themselves requiring the stout bracing afforded by the tracery. The tracery had the further duties of stiffening the wall of which it formed part and of giving firm support to the embracing window-head. Thus, although perhaps no feature of Gothic design appears more purely ornamental than the elaborate tracery of the windows, it has, like almost all decorative parts, a constructional *raison d'être*, forming, in fact, part of the skeleton of the Gothic frame. The attention given by designers to tracery led it, by gradual stages, from simple beginnings to a period of florid elaboration, so that by this feature, more readily than by any other, it is possible to trace the various periods in the history of Gothic architecture.

FRANCE.—Gothic architecture in France may be divided into three periods, of which the approximate dates are:

Early Period (*cir.* 1160–1270).
Middle Period (*cir.* 1270–1370).
Florid or Flamboyant Period (*cir.* 1370–1550).

The second half of the twelfth century was a period of extraordinary activity with the French cathedral builders. The Church at this time was a strong and popular institution. Many of its cathedrals, built by the careful but unscientific Romanesque builders, were collapsing under the weights of their ponderous vaults, and were in urgent need of renovation. In other parts new structures were required, and with such energy did the bishops, backed up by the people, set to work that, at the end of the twelfth century, as many as sixteen cathedrals were being built, or entirely reconstructed, among them—to give only the more familiar names—being those of Bayonne, Lisieux, Laon, Tours, Poitiers, Troyes, Chartres, Bourges and Notre Dame, Paris.

The buildings of this date were marked by simplicity of treatment of the groined vaulting, of the arrangement of parts and of the detail; the carving was simple and vigorous, the windows long and narrow, and frequently grouped in pairs beneath a pointed arch, the head pierced with a circular light, as in our plate-tracery. The interior

division into bays was marked on the exterior by a uniform series of pinnacled flying buttresses. A steep wooden roof, covered with lead or tiles, completed the structure, protecting and allowing space inside for the lofty stone vaulting.

Notre Dame, Paris (1163–1214), one of the earliest, shows a perfectly symmetrical plan with semi-circular east end, richly sculptured triple western portals, rose-windows in the chief gables, and most of the characteristic features of the French cathedral of the thirteenth century.

Later in date than Notre Dame was the graceful cathedral of Chartres (1194–1230), (72) the richly decorated northern spire of which, added in the sixteenth century, contrasts in an instructive manner with the simple and beautiful lines of its southern companion. The magnificent windows:

> Pride of France,
> Each the bright gift of some mechanic guild,
> Who loved their city, and thought gold well spent
> To make her beautiful with piety—

are filled with a glorious setting of stained glass, a lasting memorial of the interest and enthusiasm which all classes displayed in the building of their temple.

In the beautiful cathedral of Amiens (1220–1288) (74), pure Gothic found its highest expression; " in dignity inferior to Chartres, in sublimity to Beauvais, in decorative splendour to Rheims, and in loveliness of figure-sculpture to Bourges. It has nothing like the artful pointing and moulding of the arcades of Salisbury—nothing of the might of Durham. And yet, in all, and more than these, ways, outshone or overpowered, the cathedral of Amiens deserves the name given to it by M. Viollet le Duc:— 'the Parthenon of Gothic Architecture.'"*

As the type of French Gothic, the cathedral of Amiens is contrasted later with that of Salisbury (p. 73).

Almost invariably the French cathedral plan (68) showed a semi-circular or apsidal arrangement of the east end. At Laon and Poitiers we find the square end, so general in England; but in the typical plan the east end had a series of radiating chapels, forming a *chevet*—an arrangement already noticed in the Romanesque church of Notre Dame at Clermont, and seen in the illustration of Amiens Cathedral.

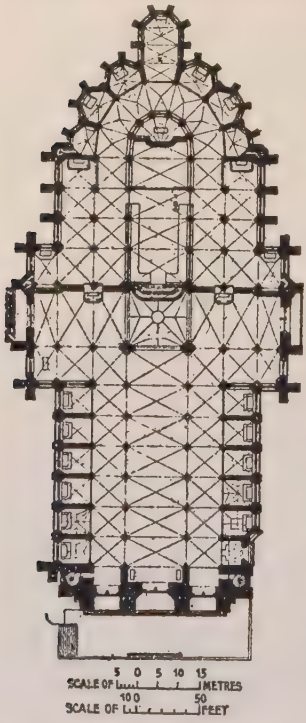
The transepts were not so fully developed as with us: Bourges has none, and Notre Dame, Paris, has only rudimentary ones. The main (west) front usually contained a triple portal, and over this ran a frieze

* Ruskin: " The Bible of Amiens."

of niches filled with royal statues. The superb porches, with elaborately sculptured, deeply recessed archways enriched with " dedicated shapes of saints and kings," are specially characteristic of French design, and form the richest feature of the exterior. In many examples they project a considerable distance in front of the main wall and are roofed with massive gables. Magnificent examples are found at Bourges, Chartres, Amiens and, perhaps finest of all, at Rheims; witness the old couplet:

Choeur de Beauvais, portail de Rheims—
Clocher de Chartres, nef d'Amiens,

which puts before us the popular idea of the four grandest features to be found among the Gothic cathedrals of France.



68. PLAN OF AMIENS CATHEDRAL

The French buildings are generally on a vaster and more imposing scale than our English cathedrals. There is no Gothic design on this side of the channel comparable in these respects with the giants at Rheims, Paris, Bourges, Amiens or Chartres, all of which were in course of erection in the early half of the thirteenth century. In respect of length the cathedrals of France did not differ greatly from the English examples, for the longest (Amiens, 450 feet), is exceeded by some of our cathedrals, e.g., Winchester, Ely and York; but they surpassed ours in width and area, and especially in boldness and loftiness of the vaulting.

To the first period belong several monastic buildings, amongst others the picturesque Mont S. Michel, portions of which, however, were re-built later.

Of the buildings of the Second Period the most noteworthy is the unfinished cathedral of Beauvais. The foundation dates from 1225, but the greater portion of the design of this—the loftiest and slenderest of all French cathedrals—was not carried out until the second half of the thirteenth century. In this design the builders carried the Gothic principles to the extreme limit of daring, and in a few years the slender

supports collapsed, and the building required to be almost entirely reconstructed. As it now stands, the height from the pavement to the top of the vaulting is not less than 160 feet! Similar measurements at Ely, a longer cathedral of the English type, give less than 75 feet.

Few cathedrals of the Middle Period were completed, except after long delays, for the enthusiasm had waned. In S. Ouen at Rouen, built between 1320–1350, we have a fine example, with additions of a later date. Limoges (1272) was begun on an extensive scale, but is still incomplete; Toulouse, begun in the same year, was not completed until the sixteenth century; Narbonne is still unfinished. Yet there was no inconsiderable amount of building carried on, and many additions were made to the earlier designs which have greatly enhanced their beauty and interest. The great rose-windows, as at Rouen, are features of this period.

Profusion of rich detail and florid elaboration of tracery curves marked the Third, or Flamboyant, Period. Such work is seen in the church of S. Maclou at Rouen; finer still in the rich façade which was added to the older cathedral of Rouen at the beginning of the sixteenth century; and again in the later, "New", northern spire of the W. Front of Chartres (1513), and S. Vulfran, Abbeville. In each of these examples may be noticed the striking development of elaborate tracery; the gables over the porches are an open network of stone, suggestive of windows without glass. Notable examples of the flamboyant work are the façades of Troyes and of Tours, the church of S. Jacques at Dieppe, and the Hotel de Ville at Rouen, of the same date as the cathedral front (1500). The florid architecture of the sixteenth century culminated in such fantastic work as the sepulchral church of Brou, in which almost all dignity of composition is frittered away in a dazzling profusion of lace-like carving, marvellous masterpieces of the craftsmen's art:

> Flemish carvers, Lombard gilders,
> German masons, smiths from Spain—

but a decadent form of architecture.

The Gothic spirit in France was not confined to ecclesiastical buildings, but pervaded every branch of secular and domestic architecture. Many a French town, as Troyes, Provins or Bourges, retains fine specimens of the later Gothic house; witness the picturesque house of Jacques Coeur at Bourges (1443). The more important buildings were of stone; but in shop-fronts and designs on a smaller scale the half-timbered façade, with its overhanging, steep-pitched

gables and fully moulded beams and brackets, was more frequently seen. With later domestic buildings details become less distinctly Gothic, but the high gables and steep roofs and other Gothic traditions survived, and, as we shall see, strongly influenced the designs of the French Renaissance builders of the sixteenth and later centuries.

GREAT BRITAIN.—The division of Gothic architecture in England into periods presents some difficulties, but whatever terms be accepted, we must bear in mind that all Gothic building was more or less in a state of transition, and that there was always continuous development. Summer has to be divided from spring and spring from winter at fixed dates, whatever may be the weather at the time; yet wintry incursions into spring are by no means unusual.

Prof. Lethaby* has endeavoured with some success to sub-divide the periods, and we quote his thoughtful suggestions here for the reader's benefit.

A transition, leading to Gothic, he points out, is visible in works built about 1150, and the Gothic manner of building lingered on till the middle of the sixteenth century. We may thus give to the Gothic a total period of four centuries. In 1348–50 occurred the Great Plague called the Black Death. From this time later Gothic begins, and it is well to remember the date, 1350, as the key to the chronology of British art. By putting two centuries in front we get 1150, the date of the beginning, and adding two centuries we obtain 1550, for the death date. The four centuries he sub-divides into nine sub-periods; but simplifying his classification more nearly to accord with that of Mr. F. S. Prior, popularised by Mr. C. E. Power's admirable little books on "English Mediaeval Architecture", we have:

1100–1150	Anglo Norman.	
1150–1200	Transitional Norman—in process of change to Gothic.	
1200–1250	Early English. (Lancet).	
1250–1300	Geometrical. (Mid-Gothic).	
1300–1350	Decorated. (Curvilinear).	
1350–1400	Perpendicular.	(Early Perpendicular).
1400–1450		(Mature Perpendicular).
1450–1500		(Late Perpendicular).
1500–1550	Early Tudor.	

* W. R. Lethaby: "Architecture."

Alternative terms still in use for some of the sub-periods named are given in parenthesis.

Professor Lethaby's further suggestion, allowing a still greater simplification, is that as " the most characteristic phases of the Norman, Early English, Decorated, Perpendicular and Tudor styles fell in the twelfth, thirteenth, fourteenth, fifteenth and sixteenth centuries, these names may stand more exactly for the styles as they were in the first halves of those several centuries." Needless to say, the periods overlapped one another to some extent, and there was no sudden change in the style. The course of architecture throughout the periods was uninterrupted, as we shall see by noting the leading characteristics of each:

Early English, or Early Thirteenth Century. Long, narrow, lancet-headed windows; wall arcades typical; angle-buttresses set squarely; deeply undercut mouldings to the arches; slender, detached columns to doors and windows; circular capitals, unfoliated, or with crisp bulbous foliage; clustered piers; little ornament, except the *dog-tooth.*

69. BALL-FLOWER ORNAMENT

Decorated, or Early Fourteenth Century. Greater richness of detail; buttresses enriched with crockets, niches, etc., and often set obliquely at the angles; windows wider and more important, and divided by mullions, the upper part filled in with geometrical or (later) elaborate flowing tracery; mouldings shallower and less numerous; carved foliage in the capitals less crisp, with natural forms of oak leaves, etc.; finely-carved figures and bosses; *ball-flower* ornament (69).

Perpendicular, or Early Fifteenth Century. Larger windows with numerous mullions and with vertical tracery carried through to the top of the arch, often intersected by horizontal transomes; almost all wall surfaces panelled, in imitation of the window treatment, doorways frequently finished with a square label over the arch; weak, shallow mouldings; octagonal piers; open timber roofs of elaborate construction, with carved figures of angels. With the later work, *Tudor-rose* (70), *portcullis,* and *fleur-de-lys* ornaments.

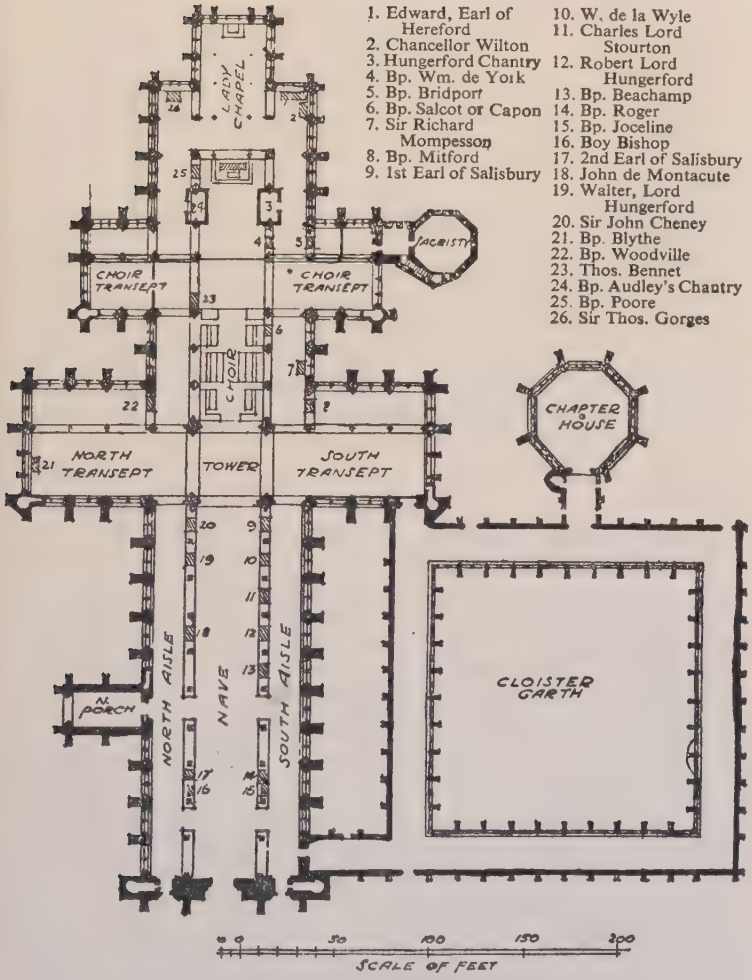
70. PORTCULLIS AND TUDOR ROSE ORNAMENTS

Tudor, or Early Sixteenth Century. Features similar to the Perpendicular, but more fully developed, or carried to excess; arches

flattened at the apex, and struck from four centres; more elaborate vaulting; richly ornamented parapets with battlements. Many important collegiate buildings, mansions and manor houses erected during this century, in the designs of which the Tudor features gradually mingled with and merged into those of the Renaissance.

There was no Gothic cathedral building era in England to compare with the early part of the thirteenth century in France. We have seen that the period following the Norman Conquest had been a very active one, and had covered the island with such ecclesiastical buildings as were unrivalled even in France at that time. These grand structures were sufficient for the people's immediate wants. But as the Gothic tide began to make its presence felt, the new features were gradually introduced into new work which was in progress, and, after a period of transition, began to supplant the sturdy Norman details and the round arch, though there was no wholesale pulling down and rebuilding of cathedral churches, such as was witnessed in France. Thus it comes about that the cathedrals of England are less homogeneous than those of our French neighbours, for, with one or two exceptions, they represent a mixture of styles, and are in reality Norman structures which have been remodelled and enlarged by the Gothic builders.

This fact tended to emphasise a characteristic peculiarity of the English cathedral plan—its remarkable length in proportion to its breadth. The Anglo-Norman builders, for constructive reasons, built rather narrow naves; and as it would have been impossible to widen the naves without pulling down the buildings, the subsequent Gothic additions were all in the direction of emphasising the length rather than the width, so that in several of our English plans we find the proportions of length to breadth as great as 7 to 1. At Salisbury (71), an entirely Gothic building, the dimensions are 450 feet and 78 feet respectively—almost 6 to 1. The long, narrow naves of the English cathedrals are ill-adapted for a service, or for enabling a congregation to see what was taking place at the altar; but there were compensations, for, as Fergusson points out, " in pictorial effect they surpass everything erected on the Continent, unless with greatly increased dimensions of height or width. Whether, therefore, it were hit upon by accident or design, its beauty was immediately appreciated, and formed the governing principle in the design of all the English cathedrals. It was a discovery which has added more to the sublimity of effect which characterises most of our cathedrals than any other principle introduced during the Middle Ages."



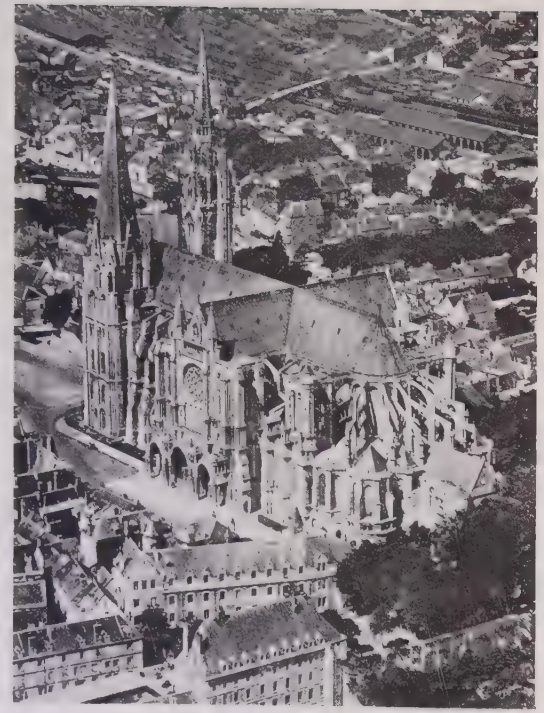
71. PLAN OF SALISBURY CATHEDRAL

The earliest traces of Gothic in England are found in Norman buildings which were in course of erection during the earlier part of the twelfth century. Pointed arches were introduced, in connection with ribbed vaults or in arcades, at Durham Cathedral before 1133 and at Malmesbury, Buildwas and Fountains Abbeys a little later on. The earliest French examples are much of the same date and there is no reason to suppose that the English builders were inspired from France; they developed their craft on individual lines. Yet French influence is renewed at Canterbury, where we find the first English application of Gothic on a complete and extensive scale.

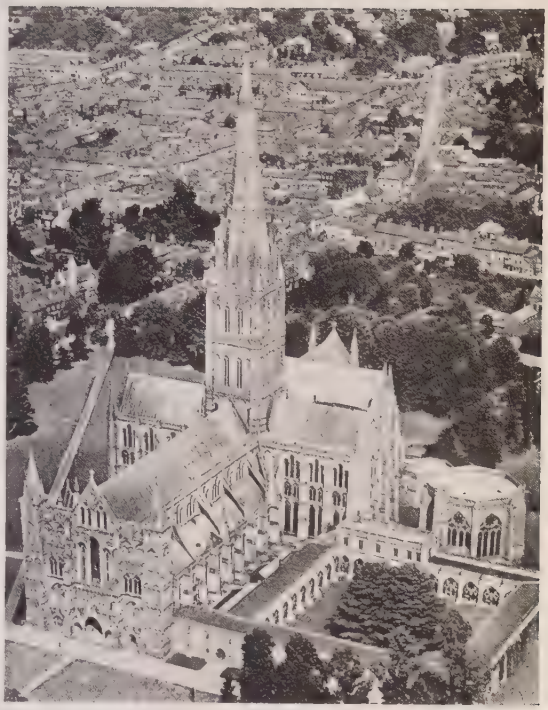
Canterbury at this early date had already seen much history. The cathedral had been rebuilt in the tenth century by Odo, but the archbishop appointed by William the Norman, Lanfranc, destroyed the whole of the old building, and commenced to rebuild it on a larger scale in 1070. It was continued by others after him and completed by Prior Conrad (1108–26) in such magnificent style that it was known as the " glorious choir of Conrad," the finest work that had been executed in England at that date (consecrated 1130), apart, perhaps, from Durham, then close on completion. When this choir was again destroyed —by fire in 1174—the monks commissioned a Frenchman, William of Sens, to superintend the work of restoration. The new choir, designed by him, affords the earliest example of the development of the Gothic style carried out in an important English building and in a complete manner. Four years after the work had been put in hand, William of Sens was killed by a fall from a scaffold, and his place was taken by an English architect, who carried out his predecessor's design with little variation. The new choir, thus completed (1175–1184), bears some resemblance to the cathedral of Sens, and is distinctly French in its plan and details, with an apsidal arrangement of the east end, and a stone vaulted roof.

The difference between the new and the old work—the Transitional Gothic of 1175 and the Norman of 1130—is very marked, and may be studied at the point in the arcading where the new abuts against the old. The illustration (75) shows the plain, cushion-shaped Norman capital at this point, supporting on the one side the sturdy round arch with its roughly axed zig-zag, on the other the Transitional work with its chiselled mouldings and carved ornament.

The great progress which the art of building had made between these dates is emphasised by Gervase, a contemporary writer, who was an eye-witness of the progress of the work. " The pillars of the old



72. CHARTRES CATHEDRAL



73. SALISBURY CATHEDRAL

74. AMIENS CATHEDRAL: THE NAVE, LOOKING EAST

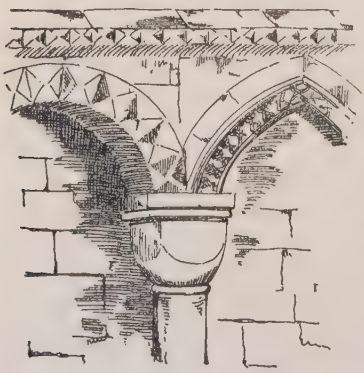
and new work," he says, " were alike in form; but in the old capitals the work was plain, in the new ones exquisite in sculpture. There the arches and everything else was plain, or sculptured with an axe and not with a chisel; but here, almost throughout is appropriate sculpture. No marble columns were there, but here are innumerable ones. There, there was a ceiling of wood, decorated with excellent painting; but here is a vault, beautifully constructed of stone and light tufa." And all this, he wisely remarks, will be better understood by inspection than by any description.

When Gothic had once been used throughout a design of such importance, it soon became generally adopted. In 1186 Hugh of Burgundy was appointed Bishop of Lincoln, and at once set to work on his cathedral, the east end of which—St. Hugh's choir—he rebuilt in pure Gothic style. But in various parts of the country the Norman round arch continued in use, in conjunction with the pointed arch, until the beginning of the thirteenth century, from which period the commencement of the sway of Gothic in England may be said to date.

Within the early years of the century many cathedrals were enlarged in the style, and the period gave us, among others, such works as the magnificent west porch of Ely, the presbytery of Winchester, the choir of Rochester, Fountains Abbey, and the choir of the Temple Church, London. But for the typical church of this date we look to Salisbury (1220–1258), an entirely new foundation, which was designed and built throughout in the Early English, or thirteenth century, style (71). A comparison of this with the plan of a typical French cathedral of the same date, Amiens (68), brings into relief the points of divergence between the English and the French models:

Amiens	*Salisbury*
Proportion of length to breadth, about 3 to 1.	Proportion of length to breadth, about 6 to 1.
Semi-circular east end with *chevet*.	Square east end.
Transepts unimportant, with very slight projection.	Double transepts, with deep projection.
Imposing and richly decorated triple west porch.	West porch small, almost mean.
Lofty vaulting (140 feet in height), requiring an elaborate system of flying buttresses for support.	Low vaulting (84 feet), with simple exterior treatment.
Circular rose-window in the west front, and elaborate tracery.	Lancet-headed windows with little tracery.

The central tower, rising above the crossing of the nave and transepts, was a leading feature in the English cathedral design, as at Salisbury, where the spire rises to the height of 424 feet, and dominates the whole design. Such an effect was impossible in the French building, for the lofty vaulting and the high-pitched roof gave such height to the structure that any attempt at a dominating feature was rendered futile by reason of the immense mass of the building. The central flêche of Amiens appears insignificant, yet in height it is almost equal to that of Salisbury, the loftiest of our spires; while the north and south towers, more than 200 feet high, which would add dignity to an English cathedral, hardly rise above the ridge of the roof. The lofty French cathedral, in fact, was designed to be seen from the *inside*, as Ruskin, in his eulogy of French Gothic, and of Amiens cathedral in particular, admitted: "The outside of a French cathedral, except for its sculpture, is always to be thought of as the wrong side of the stuff, in which you find how the threads go that produce the inside or right-side pattern." In England our designs are less ambitious, but there is no "wrong side" to them; and there is something as essentially English about the Cathedral of Lincoln or the mighty pile of Durham, with its three dominating towers (frontispiece) as there is about Wells with its charm and quiet dignity, or Salisbury and its close of:



75. DETAIL OF ARCADE, CANTERBURY

> Red brick and ashlar long and low,
> With dormers and with oriels lit.

We must not overlook one fact, however, which further helps to explain the emphatic difference between the French and the English Gothic exteriors. The French building was essentially a cathedral church, the seat of the bishop, who represented the active religious life of the community; it was desirable that his seat, his cathedral church, should be placed in the midst of the busy life of the city, just as would be the case with an important civic building. The English building, on the other hand, was in many cases not primarily a cathedral, but an abbey church, attached to a monastery. The monks, to whom the

abbey owed its foundation, sought for their habitation a secluded spot, rather than the busy city, so that they might meditate undisturbed in their cloisters, pray in their church, fish perhaps in their stream. As years went on, the old order changed; but the cathedrals of England, in many of their features, have always retained the impress of these earlier days.

The abbey of Westminster (1245–1269), whose originally quiet surroundings have now given place to the bustle of London life, presents a curious blending of the French and English plans. The nave and deep, square transepts are as thoroughly English in arrangement and detail as the east end, with its *chevet* and apsidal chapels is French. The unusual height of the vaulting—100 feet—and the consequent development of the flying buttress, are also suggestive of French influence.

Towards the close of the thirteenth century, the desire for additional richness and ornamentation brought about a gradual change in the character of the architecture. This was most marked in the treatment of the window openings, which were increased in size and divided into separate lights by mullions, formed in the upper part into geometrical tracery. These geometrical designs soon gave place to lines of double curvature, or flowing tracery, which the English architects treated with great skill, and which became the characteristic feature of the Decorated style during the fourteenth century, culminating magnificently in such works as the west window of York Minster and the east window of Carlisle Cathedral.

Hand in hand with the increasing importance of the window openings we find, as in France, considerable development in the art of decorative glass-staining. In the fifteenth century the majority of the great church windows of England were filled with richly coloured stained glass, but the iconoclasts of the seventeenth century did their work only too thoroughly. The glass was too "idolatrous" for the taste of the Puritans, and met with no quarter at their hands. A paragraph from the "Petition of the Weamen of Middlesex," in 1641, which bore 12,000 signatures, helps to explain the extraordinary disappearance of most of the glass from our English churches. "We desire," it says, "that prophane glass windows whose superstitious paint makes many idolaters may be humbled and dashed in pieces against the ground; for our conscious tells us that they are diabolicall and the father of Darknesse was the inventor of them, being the chief Patron to damnable pride."

The change from the graceful window forms of the Decorated to the stiff rectangular lines of the Perpendicular period seems almost like a reaction. Gothic builders at the end of the fourteenth century were seized with the desire to emphasise in every possible way the vertical lines of the design, so that the "perpendicular" line became the dominating feature of every detail. The whole wall surface, inside and out, was divided into a series of rectangular panels, and as the enormous windows occupied the whole space at the east and west ends, as well as the wall spaces between the buttresses, they were treated as a series of glazed panels. The exterior of King Henry VII's Chapel at Westminster Abbey is an elaborate example of this method of treatment (77). Simultaneously with this was developed the beautiful, and essentially English, form of vaulting known as fan-tracery, familiar to us in the ceilings of King Henry VII's Chapel, Westminster; S. George's Chapel, Windsor; Divinity Schools, Oxford; and the Chapel of King's College, Cambridge (76):

> That branching roof
> Self-poised and scooped into a thousand cells,
> Where light and shade repose, where music dwells
> Lingering—and wandering on as loth to die.

The chapter-house, which forms a graceful adjunct to many of our cathedrals, is another feature peculiar to English architecture. In Norman times this was rectangular in form—that at Durham (1140) was unusual in being apsidal—as at Bristol (1155); but shortly after this date, the circular or polygonal plan, with a central column, came into use. The first to adopt this form was the architect of the chapter-house (before 1140) at Worcester, a building which became the recognised type for later designs at Lincoln (1225), Salisbury, Westminster (1250), and Wells (1292). In each of these a central column gives the necessary support to the vaulting of the roof. At York and Southwell the central pillar has been dispensed with, and the Gothic ceiling is carried entirely upon the walls of the octagon. The design at York gains immeasurably by the removal of this support, and the beautiful work almost justifies the builder's inscription:

> Ut Rosa flos florum,
> Sic Domus ista Domorum.

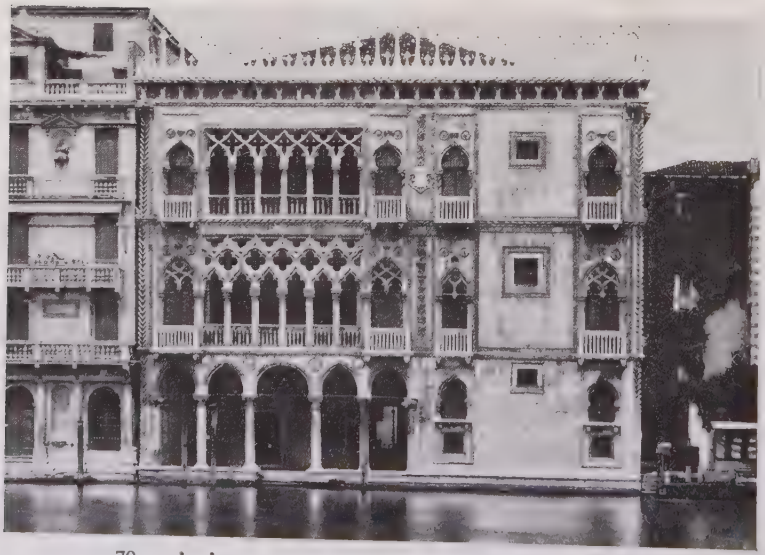
The ceiling, in the form of a dome, is beautiful in detail, but executed in wood.

Cathedral building did not monopolise the attention of our architects, as it did in France. A most complete record of the progress of Gothic

76. THE CHAPEL, KING'S COLLEGE, CAMBRIDGE

77. HENRY VII'S CHAPEL, WESTMINSTER ABBEY

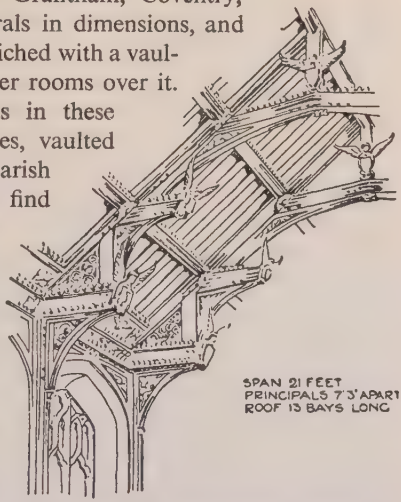
78. STOKESAY CASTLE, SHROPSHIRE



79. CA' D'ORO, VENICE, FRONTING THE GRAND CANAL

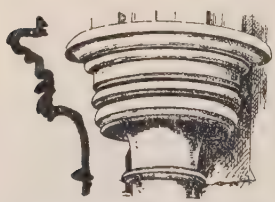
is to be found in the beautiful parish churches which are scattered over all parts of the island. Many of these show a beauty and variety of detail equal to the foremost of the cathedrals. All periods are represented, but the churches of the fourteenth and fifteenth centuries abound with the finest examples. The typical English church plan has a nave with side aisles and a clerestory, a long, narrow chancel with square east end, west tower, and south doorway. The most important churches, as those of Boston, Grantham, Coventry, etc., almost rivalled the cathedrals in dimensions, and frequently had a south door enriched with a vaulted porch, with a library or other rooms over it.

Except on a small scale, as in these porches, or in isolated instances, vaulted ceilings were not found in the parish churches. Instead of them we find open timber roofs, treated with remarkable ingenuity, and often with great elaboration. The English carpenters showed a somewhat perfunctory knowledge of scientific roof design —unlike the French, who developed their high-pitched roofs with characteristic *élan* —but were first-rate craftsmen and extremely skilful in devising varied and richly decorative arrangements. The *hammer-beam* roof, giving a serrated-arch profile, consisting of a series of tiers projecting half arches, rising up the roof slopes, was one of their most notable achievements (80). The trusses and brackets were vigorously moulded, and the ceiling spaces treated in a highly decorative manner. Fine examples of these roofs are found in the Perpendicular churches of Norfolk, and in the halls of many of the colleges of Oxford and Cambridge, notably that of Christ Church, Oxford. Largest and most famous of all is the great roof of Westminster Hall, London (1399), covering a space 239 feet in length by 68 feet in width. Characteristic work is found too in many of the old castles, as in the castle, or fortified Manor House, of Stokesay, in Shropshire (78), with its later, Elizabethan, half-timbered gatehouse.



80. DOUBLE HAMMER-BEAM ROOF, S. STEPHEN'S, NORWICH

There are few fields of study more full of interest than these buildings, or than the old parish churches of England. Much history which would otherwise have been lost may be found written upon church walls by those who have eyes to see it; nor is more than a slight acquaintance with the characteristic features of each period necessary to enable the student to read the history and to assign a date to the construction of the work. In distinguishing the periods, all mouldings and ornaments are of very great value. Mouldings of the thirteen century were seldom decorated with any ornament other than the dog-tooth, which took the place of the axed zig-zag of the Normans. The bold, undercut mouldings gave strong effects of light and shade, and required little enrichment; the unfoliated moulded capital (81) is characteristic of Early English architecture; where carved foliage was used it was crisp, bulbous, treated conventionally, and curved boldly outwards, appearing to grow out of the surface (82). The mouldings of the Decorated period were less defined, and were seldom undercut; the foliage was naturalistic, representing oak and vine leaves, or sea-weed, and the ball-flower (69) supplanted the dog-tooth ornament. In Perpendicular work the Tudor-rose (70), portcullis, and fleur-de-lys appear as ornaments upon richly panelled wall-surfaces; mouldings were wide and shallow, and of secondary importance. In Norfolk and Suffolk the panels on the exterior wall surfaces were frequently filled in with flint work. Wooden screens with elaborate tracery shut off the chancel.



81. UNFOLIATED EARLY ENGLISH CAPITAL, SALISBURY

82. FOLIATED EARLY ENGLISH CAPITAL, HEREFORD

In striking contrast to later times is the almost entire absence of municipal buildings throughout the four centuries succeeding the Norman conquest: "the king, the baron, and the bishop were the estates of the realm; the people were nowhere," and neither municipalities nor guilds could assert an independent existence.

ITALY. Gothic architecture, from causes which are not far to seek, never took deep root in Italy. In the first place the style was utterly

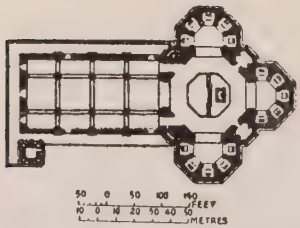
unsuited to the brilliant climate of a country where it seemed " always afternoon ". The Italian regarded his church as a cool resort from the eternal glare of the sun; and the small windows of the basilica, with its grateful gloom, were more to his liking than the " walls of glass " of the style in vogue amongst his neighbours. Again, from the time of the Roman empire, Classical tradition had been very strong throughout the country, and had permeated its architecture. The Italian was familiar with, and justly proud of, the Classical forms of Rome, upon which the architecture of Western Europe had been modelled. The works of his ancestors, the Romans, had been marked by breadth, solidity, simplicity of parts and by emphatic treatment of horizontal lines; it was hardly to be expected that the narrow, lofty aisles, the multiplicity of vertical lines and mouldings, and the minuteness of detail of the Gothic builders should find favour with him. Moreover, the scientific principles of Gothic construction did not appeal to him, for the mediaeval Italian was never a constructive designer. He relied for interior effect upon large unbroken wall surfaces, severe and plain in stonework and plaster, or sometimes sheathed or patterned in marble and mosaics, or, again, adorned with colourful frescoes.

When Gothic was introduced, therefore, it was received as a foreign or imported style, which was grafted upon the older forms, with the result that Italian Gothic never divested itself of the influence of Roman traditions. It owed its introduction to the mendicant monks, whose travels brought them into contact with the outer civilisation. Many of the earliest and largest churches were built by these monks—Dominicans or Franciscans. S. Francis of Assisi, the founder of the Franciscans, died in 1226, and the church, S. Francesco, (1228–1253) which enshrined his body was one of the most remarkable examples of Italian Gothic, as well as one of the earliest.

The most successful examples of the style in Italy are the cathedrals, built upon an imposing scale, and showing, in almost every instance, the peculiarities of the Italian treatment of Gothic: Milan (1385–1418), the largest of all mediaeval churches except Seville; Siena (1243), Orvieto (1290), Florence (1294), Ferrara, and the church of S. Petronio, Bologna (1390), projected upon a vast scale in emulation of the Cathedral at Florence, which it much resembles in character internally, but never completed. In the majority of these designs there is little, with the exception of the details, to distinguish them from the earlier Romanesque buildings. At Siena and Orvieto the round arch is freely used, while a striking interior effect is gained by the use of alternate

bands of black and white marbles. The façade in each case is a rich composition of coloured marbles with three gables, and a deeply recessed triple porch, enriched, at Orvieto, with gorgeous mosaics. The love of the Italians for colour decoration in preference to the brilliancy of stained glass finds expression at Orvieto, where the small window-openings of the aisles are filled with slabs of rich translucent alabaster.

The cathedral of Florence (84), begun in 1294 by Arnolfo del Cambio, was not completed until the fifteenth century, when the dome was added by Brunelleschi. Here everything is on a grand scale; but the architect made the mistake of thinking that largeness of parts would invest the whole with dignity and grandeur. The vast nave, which, in a French design of similar importance, would have been sub-divided into ten or twelve bays, is here spanned by four great arches, which are left bare, with hardly a moulding or a vestige of detail to give scale to the compositions. The walls above are bare and colourless and —save for the beautiful glass—cannot fail to disappoint. Of the dome we shall speak later, when dealing with the architecture of the Renaissance.



83. PLAN OF THE CATHEDRAL, FLORENCE

In direct contrast to the Cathedral at Florence is the remarkable cathedral at Milan, bewildering in the multiplicity of its parts and the elaboration of its detail. The exterior design is lost in a perfect forest of pinnacles, decorated with rich and intricate tracery:

A mount of marble, a hundred spires!

In the interior a belt of niches, filled with statuary, crowns the nave piers, in place of the usual capitals. The ceiling is painted in imitation of elaborate fan-tracery.

Milan Cathedral (1385–1418) was one of the latest of the important Gothic buildings erected in Italy, but was due to German and French master-designers and is entirely alien to Italy in character. In proof of this we find, within a few miles of Milan, a building contemporary with the cathedral, yet dissimilar in every feature and showing very little true Gothic influence. The famous Carthusian monastery, or Certosa, at Pavia, begun in 1396, was built entirely of brick and terra-cotta. Here the vaulting is Gothic, but in other respects the external

design, with its picturesquely grouped turrets, round arches, and arcaded galleries, is thoroughly Romanesque in character. The marble façade is a Renaissance addition.

The Italians, as we have seen, were great decorators rather than constructors, and Gothic art found natural expression in small decorative works such as porches and tombs, or in secular monuments. The porch of S. Maria Maggiore at Bergamo is a characteristic specimen of this work—fascinating in its clothing of Gothic detail, yet built up in so unscientific a manner as to rely for security upon a system of iron ties and clamps. And here it may be mentioned that the use of iron tie-rods, which was almost universal in Italy, indicates that the builders did not appreciate the true principles of thrust and counter-thrust, which were the essence of Gothic construction. No doubt this lack of constructive genius hampered them in their more important designs, so that we must look to decorative works for the purest expression of Gothic feeling. Giotto's campanile (commenced 1334), adjoining the cathedral at Florence is another beautiful example of Italian decorative Gothic (84). The smooth wall surfaces are entirely faced with panelling of coloured marbles, much of it delicately sculptured in low relief, and the windows are unsurpassed for their exquisite detail and grace; but there is no Gothic backbone in the design.

The civic life and enterprise of the great mediaeval towns in Italy were reflected in their municipal buildings. Cities, forming independent principalities, were constantly at war with one another, or with themselves, and the town-hall of necessity partook of the character of a fortress. Elegance was sacrificed to security, and few features were introduced, save the lofty tower and the frowning cornice, each of which fulfilled a definite purpose; yet there are few more delightful and expressive designs than the Palazzo Vecchio, Florence (1298); or the Palazzo Pubblico, Siena (1290) with its slender and graceful Mangia Tower. In Venice alone, all-powerful, and therefore peaceful, the architect was able to give full play to his fancy, and produced examples of domestic Gothic art unrivalled in any country in Europe. Carrying on an extensive trade with Byzantium and with many Eastern ports, Venice developed a unique style in which much of the Byzantine grace and richness were blended with the Gothic details of the West, and which found its highest expression in the remarkable Doges' Palace (1309) adjoining the church of S. Mark, " the centre of the most beautiful architectural group that adorns any city of Europe, or of the world." The design, with its double storey of arcades and traceried

arches, is familiar, from illustrations and photographs, to readers in all parts of the world, and has received added fame from the loving pen of Ruskin, to whom it represented " a model of all perfection." " The front of the Doges' Palace," he writes, " is the purest and most chaste model that I can name (but one) of the fit application of colour to public buildings. The sculpture and mouldings are all white; but the wall surface is chequered with marble blocks of pale rose, the chequers being in no wise harmonised, or fitted to the forms of the windows; but looking as if the surface had been completed first, and the windows cut out of it. . . . It would be impossible, I believe, to invent a more magnificent arrangement of all that is in building most dignified and most fair."

Many choice examples of Venetian Gothic are found along the banks of the Canal, none more beautiful than the refined and sumptuous Cà d'Oro (79), and the Pisani and Foscari Palaces.

84. THE CATHEDRAL, CAMPANILE, AND BAPTISTERY, FLORENCE

85. THE OLD LIBRARY, VENICE

Jacopo Sansovino, Architect

86. S. MARIA DEI MIRACOLI, VENICE

Pietro Lombardo, Architect

CHAPTER VII

RENAISSANCE ARCHITECTURE IN EUROPE

In the preceding chapter we have seen that Classical tradition—derived from the days of the Roman empire—was too strong in Italy to allow the principles of Gothic to be received there with any degree of favour. The Italian never ceased to look upon the style as a foreign or imported one. The very name with which they branded it, " Gothic ", which has now lost its original meaning, was intended to distinguish the "barbarous" style from their own national architecture. When the Gothic style was used, it was so modified by the Italian architect that many of its characteristic features quite disappeared. As an example, the great cathedral at Florence was noted, in which the nave was divided into four colossal bays, each with a span of almost 60 feet. The designer did not realise that these classical ideas of spaciousness and largeness of parts were fatal when applied to Gothic designs.

Yet Arnolfo del Cambio, the architect of the cathedral of Florence, was one of the greatest builders of the Middle Ages. His plan for the Duomo (Cathedral) was enlarged by his successors, and the present form of the great aisled nave (83), 130 feet across its full width, was due to Francesco Talenti, who also reconstructed the loggia built by Arnolfo on the site of Or San Michele, and gave that building too, its present design (1336). The eastern part of the cathedral was laid out in 1366 according to the plans of a commission of architects, and comprised three large apses, each with five radiating chapels, enclosing a vast octagonal crossing, 138 feet 6 inches in diameter. The work of construction was continued steadily, and by 1421 had advanced as far as the top of the half-domes of the three apses (84). Oddly enough, no one appears meanwhile to have had any clear idea as to how the crossing of the church was to be covered over, for in 1418, a public competition was held, inviting schemes for its completion, as a result of which, the work was entrusted to a young competitor named Brunelleschi. Now the story of Brunelleschi is the story of the origin and growth of Renaissance architecture in Italy.

The Renaissance, or revival of Classical forms in art and literature,

was the result of a great national and intellectual movement which manifested itself in Italy during the fourteenth century, and thence spread over the whole of Western Europe. Many causes contributed to the revival: the fashion, which became general, of reading and studying the ancient Greek and Latin authors: the existence, in Italy, of old Classical monuments, from which the styles and details might be studied; the inherited Classical tradition; perhaps, too, the asceticism of the Middle Ages, against which the freedom of the Renaissance was a reaction. Added to this, the Gothic style of architecture, which builders were endeavouring to introduce into Italy, was, as we have seen, unpopular, and unsuitable to the brilliant Italian climate.

These conditions gave Brunelleschi his opportunity. At the age of twenty-two he had unsuccessfully competed with Ghiberti for the making of bronze doors for the Baptistery. Having left Florence after this, with his friend Donatello, later to become as famous a sculptor as Brunelleschi an architect, he made his way to Rome, where he worked as a goldsmith, giving all his spare time to the study of the architecture of the old Roman empire, in an endeavour to grasp the true principles of the Classical style. On his return to Florence his mind was full of the great scheme for completing the Duomo, which, though it had been in course of erection for more than 110 years, was still unfinished. Amongst those in authority there was much difference of opinion as to the best manner of covering the great octagon and the apses. It was not, as we have said, until 1418 that the council was held in Florence which definitely settled this great question, when the competitors submitted some extraordinary schemes. One advised that the dome should be supported by a central pillar; another suggestion, which seemed to find favour, was that the space over which the dome was to be built should be covered with a huge mound of earth. Coins were to be mixed with the earth, so that the people—after the dome was complete—might be willing to remove the soil from the site for the sake of the money they would find in it ! Brunelleschi appears to have been the only architect who felt confident of being able to construct the dome without the use of internal supports, and the work was accordingly entrusted to him; but so little confidence had the authorities in him that they appointed Ghiberti—his successful rival of the bronze doors, who knew nothing of architectural construction—to be his colleague. Ghiberti was quite unfitted for the task, and Brunelleschi made many unsuccessful attempts to get rid of his partner. Vasari amusingly describes his last, successful ruse:

" One morning," he says, " Filippo (that is, Brunelleschi), instead of appearing at work, stayed in bed, and calling for hot fomentations, pretended to have a severe pain in his side. When the workmen heard of this, while they waited to know what they were to do that day, they asked Ghiberti, what was the next thing ? He answered that it was Filippo who arranged all that, and that they must wait for him. ' But do you not know his mind ? ' they asked. ' Yes,' said Ghiberti, ' but I will do nothing without him.' And this he said to cover himself; for not having seen Filippo's model, and never having asked of him how he meant to conduct the work (for fear of appearing ignorant), he was now obliged to remain inactive. This lasted two days, and the workmen at last betook themselves to the Commissioners who provided the materials, asking what they were to do. 'You have Ghiberti,' was the reply; ' let him exert himself a little.' The Commissioners then went to see Filippo, and having condoled with him in his illness, told him of the harm which his absence was causing to the work. ' Is not Ghiberti there ? ' he asked passionately. ' Why does not he do something ? ' ' He does not wish to do anything without you.' ' I could do very well without him,' said Filippo. The hint was not taken, however, for Ghiberti continued to draw his salary, without doing any work, although his removal was promised.

" Filippo then tried another expedient. He presented himself before the Commissioners, and addressed them as follows: ' The sickness which has now passed,' he said, ' might have taken away my life, and stopped this work: therefore if it ever happened that I got ill again, or Ghiberti—whom God preserve !—it would be better that one or the other should continue his own work: therefore I have concluded that, as your excellencies have divided the salary, it would be as well to divide the labour, that each of us, being thus stimulated to show how much he knows, may be honourable and useful to the Republic. There are two difficult things to be done—the bridges upon which the masons must stand, and the chain which is to bind together the eight sides of the cupola. Let Ghiberti take one of them, and I will take the other, that no more time be lost.' "

This arrangement settled Ghiberti. He took in hand the chain, but could make nothing of it, and was at last removed from the works.

Great difficulties were experienced in the construction of the dome, and the work was frequently delayed in progress, so that, in the words of an old writer, the vain Florentines considered that " the heavens were jealous of their dome, which bade fair to rival the beauty of the

blue ethereal vault itself." It was completed in 1434, apart from some details which still are wanting, the lantern being added in 1462, after Brunelleschi's death.

Brunelleschi's octagonal dome is not, in truth, artistically superb. It dwarfs the church with its bulk and is overlarge in its parts to accord with the older mediaeval building, and its silhouette has little of the grace of Giotto's tower or of the charm of the smaller domes which cluster at its feet. Yet it is tremendously important to the course of architectural history, for it incorporates a new constructive principle, as revolutionary as the principle of the Gothic ribbed vault. Never before in history had so vast an arched vault been raised on high walls without a mass of masonry near its base to counter its active outward thrust. This dome is double, in two masonry shells, set near together but opening a little at the top; they are laced together by eight main radial ribs and sixteen smaller intermediate ribs; there are other arched ribs running horizontally so as to make the whole into a skeleton frame, and all the stones are keyed together and locked with metal. It will be recollected that Roman and Byzantine domes show only a saucer-shape on the outside, because of the weight of buttressing masonry piled about their bases, but this dome stands on a massive, cylindrical " drum ", 16 feet thick and nearly 40 feet high, pierced by circular windows to give light to the crossing below. As in all great works of architecture, there is much that is old as well as something that is new in the constructive methods employed in this mighty work. Roman and Romanesque, Byzantine even, here have contributed ideas, but Brunelleschi's major secret was that he proposed to *tie* the vault together to prevent its bursting outwards, instead of placing counter-weights of masonry against the lower part as was the time-honoured method. The ties used are metal chains and a complete ring of heavy timbers, bound together with iron plates, all solidly embedded in the masonry.

This feat of daring set a precedent which the Renaissance architects followed with high enthusiasm, for it showed a ready means of erecting majestic domes, as glorious without as within; one shell for the outward effect and another, connected but not concentric, for the inner, raised high on a windowed, cylindrical drum; the whole a soaring, dominating mass and a fitting adornment and culmination to the crux of a Christian church. There was still one substantial development to come; the incorporation of the Byzantine device of the pendentive, which allowed that domes might stand over the square plan at the

crossing of a church instead of requiring the support of a plan of the same shape as the dome, as is the case in this instance. Yet in the Florence Cathedral dome, Brunelleschi already had devised the vital principle which permitted the far-famed masterpieces, more gracious and charming than his, of S. Peter's at Rome, and S. Paul's, London.

While the dome was in hand Brunelleschi carried out several smaller works in Florence, which had considerable influence with his contemporaries, and turned their thoughts in the direction of the new style. One of the most delightful examples is the Pazzi Chapel (c. 1430) of S. Croce, perhaps the earliest building completed in the Renaissance style. Other well-known churches of his, basilican in type and cruciform, are S. Lorenzo and S. Spirito, very severe externally and still lacking the marble-sheathed west façades they were intended to have; inside, very gracious and light in design. The details are faultlessly Classical—the surety and swiftness with which the Florentine Renaissance harked back to the antique vein is ever a matter of surprise—but the arcades throughout, are an adaptation of the Romanesque type in which the arches stand upon columns instead of being enframed within the order as was typical old Roman practice. The Romanesque arcades usually were small in size and as we have seen, often were wearisomely reiterated in tiers; the Florentine used them far more discriminatingly and made them large enough in size to give them dignity as well as a gracious charm. The " Renaissance " or " Florentine " arcade, as it has come to be called, is one of the most delightful of the usages of the times.

All the three churches named show Byzantine influence in the important respect that domical forms are extensively used as coverings both to the vaults of arcades and over central apartments. The Pazzi Chapel has a ribbed, pendentived dome over the floor of the chapel, in which tapering small barrel vaults are supported upon the ribbed framework, wheeling about a central " eye ".

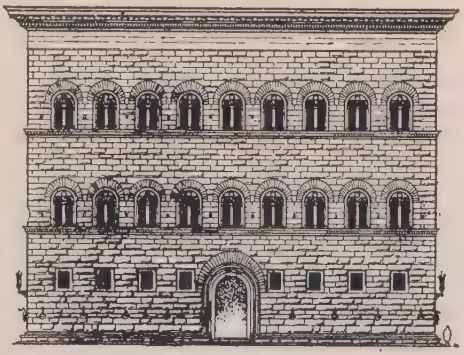
The second great exponent of Renaissance architecture in Florence was Alberti (1404–1473), who was a young man while Brunelleschi's dome was swelling out against the sky. Alberti was an ardent scholar, and the author of a valuable treatise on the art of building, a book which was, perhaps, the most important work of his life, for it became very popular, and greatly influenced the designs of his contemporaries and successors. Brunelleschi, as we have seen, had made a careful study of the imperial architecture of Rome, but in his own designs he in no way reproduced it. He merely borrowed the great leading principles of the

Roman system, and carried out the designs in accordance with his own ideas. Alberti was different: he was pre-eminently a scholar, and had a distinct leaning towards everything Latin. Even his great work was written in Latin, and his partiality for pure Roman details and models is evident in his buildings. In his Rucellai Palace at Florence, for example (1451), occurs the first instance of pilasters applied to the façade; these are introduced into each story (as in the Colosseum), the orders being superimposed, and each carrying an entablature.

Another important work by Alberti was the façade of S. Maria Novella in Florence—an applied-marble facing, in which he introduced pilasters and a true Classical pediment. In this church we see the earliest instance of the use of great scrolls for connecting the higher walls of the nave with those of the aisles, a clumsy feature which was imitated by later designers, with no greater success. The treatment of the basilican end of the church façade was one of the most difficult problems which the early Renaissance architects had to face, and they found it just as intractable a shape as had their Romanesque predecessors. In course of time they achieved tolerable results, though by the somewhat improper method of hiding the difficulties, rather than by accepting and overcoming them. The Renaissance architects were as frank as the Romans in their acceptance of the architectural elements as a means of embellishing buildings; their use of them was not always dictated by strict logic—in the last main phase of the Renaissance, the " Baroque ", logic was scarcely regarded at all—but as artists they were far superior to the Romans. They consciously imitated the Romans and were ardent classical students, but they tended to impute to their forbears an infallibility they certainly did not possess. They themselves were the artistic superiors, and at their best, almost touched the supreme heights reached by the Greeks. Like the Greeks, they recognised the unity of the visual arts and had no arbitrary division between them. Most of the great Italian architects were masters too, of other arts; Brunelleschi, sculptor and goldsmith; Peruzzi, painter; Michelangelo, sculptor, painter, poet; most could turn their hand—and did—to the decoration as well as to the design of buildings. They were not deeply interested in Roman construction; its day had gone, and the Renaissance masters, Italian, French or English, continued and developed the constructive science of mediaeval days. The Renaissance of Roman architecture was entirely superficial in character, and, as time progressed, methods of use of Classical detail diverged increasingly away from Roman precedent, though,

eventually as we shall see, a return was made again to the ancient sources for renewed inspiration.

Architecture at this period came under the generous patronage of Cosimo de' Medici, a nobleman of vast influence and more than regal wealth. Following Brunelleschi's lead there soon sprang up a band of architects imbued with the same spirit, whose genius created those magnificent monuments of the Renaissance—the Florentine palaces. Chief among these are the Riccardi (1430) by Michelozzo, the Strozzi (1489–1553) by Benedetto da Maiano, and the Palazzi Antinori, Guadagni, and Pandolfini, the latter from a design by Raphael. These are all characterised by solidity and strength, for they required to be fortresses as well as palaces; the walls were of masonry, in large blocks, often heavily "rusticated". In this rustic work, as it is inaptly named, a deep channelling marks the joints, from which the face of the rough stonework projects boldly. In some cases the rustication extends over the whole façade, but it was generally confined to the lower story. This treatment gives a pleasing variation of light and shade, suggesting at the same time a note of sturdiness which is in harmony with the spirit and temper of mediaeval Florence.



87. FAÇADE, STROZZI PALACE, FLORENCE

In the Palazzo Strozzi (87), which is a good type of the Florentine palace, the rustication is treated simply, but covers the whole façade. A serious defect in the design of many of these buildings is apparent here—the uniform height of the stories, as indicated by the string-courses at the level of the window-sills. This, together with the somewhat monotonous repetition of uniform windows, tends to detract from the interest of the design. To some extent the defect is redeemed by the great, finely proportioned cornice—added by Cronaca, who took over the works after Maiano's death—which crowns the building, and makes every other feature subordinate and of secondary importance.

These heavy walls and narrow windows reflect the disturbed civic

life of this great republic. The torch-rests of wrought metal, the dim courts, and the gloomy entrances, all tell their own history; in them we trace the habits of caution which, of necessity, characterised the Florentine leaders. And as designs they must be studied, and their merits weighed, amidst their own sunny surroundings, and in connection with the history which they helped to make; for it is impossible to judge them from their reproductions in the form of West-end clubs in sunless London. Seen in Florence, these buildings are great pages of history, which he who passes may read. Fitness is indeed one of the elements of true architecture, and few buildings can lay greater claim than these to represent the fit expression and the embodiment of the spirit of the times which produced them.

In Florence many of the architects of the fifteenth century were trained in the workshops of the craftsmen—rooms in which were carried on under one roof, the arts of the painter, the goldsmith, and the sculptor. By these craftsmen the new details were developed in decorative accessories, such as altars, pulpits, and monuments, in many of which the work is most delicate and refined; indeed, in many cases, the subordinate architectural works are artistically much finer than the buildings in which they are placed. These details were almost invariably worked in marble, with delicate mouldings, and exquisite carving in low relief. The monument to Marsuppini in the church of S. Croce in Florence is a fine example—though very elaborate, it is beautiful in form, and in the execution of every detail.

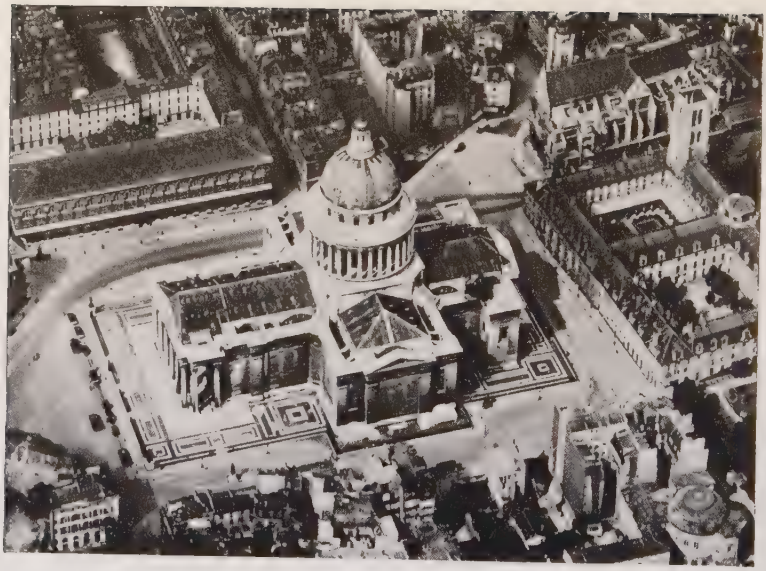
Great activity in building prevailed in other cities of Italy, outside Florence, during the fifteenth century, and notably in Milan and Venice. Rome at the earlier period was almost entirely dependent upon lesser Florentine artists, and much of the work there was not of first rank.

Milan was the first of the cities, outside Tuscany, in which the new architecture took root; and here, for the first time, we come into contact with the third great Renaissance architect, Bramante, whose work eventually culminated in the great design of S. Peter's in Rome, a design fated to be supplanted by the yet more grandiose scheme devised by Michelangelo.

Bramante was born in 1444, and by then many of the great Florentine buildings which we have noticed were already in existence. Like the great Raphael, he was a native of the small town of Urbino. His chief works were in Rome, where the progressive character of his designs initiated the full flowering of the Renaissance style, but among

88. FARNESE PALACE, ROME

Antonio Sangallo and Michelangelo, Architects



89. THE PANTHEON, PARIS

G. Soufflot, Architect

90. ST. PETER'S, ROME

Michelangelo and others, Architects

his buildings in Milan may be mentioned a considerable portion—all but the nave, which is Gothic—of the church of S. Maria delle Grazie, and the little octagonal sacristy of S. Maria presso San Satiro.

A most interesting example of the Renaissance style near Milan is to be found at Pavia, where, from 1491, a façade was added to the Certosa, or monastery. This front is covered with a profusion of marble ornament, richly and delicately wrought, like the ivory carving of a casket, but quite inappropriate for its position. The delight in ornamentation and multiplicity of small-sized parts, so much in evidence in the architecture of the Milan region, including the work of Bramante, was due to the influence of moulded terra-cotta, a hard, brownish-red, building pottery, which cannot readily be cast in large pieces. The natural material hereabouts is brick-earth, and marble was less easy to obtain; when the latter was used, it was wrought in great sculptural detail, in imitation of the commoner material, terra-cotta, which could be so readily impressed with patterns in the moulds before burning. Marble, candelabra-like carvings often appear in place of columns in window openings and in arcaded galleries, and these gave rise to the true baluster, which makes an early—perhaps the first—appearance in the Colleoni Chapel at Bergamo (1476), a work by one of the architects employed on the Certosa façade. Up to this time, parapets—the term balustrade is not, strictly, appropriate before this invention—had had either sculptured or patterned panels like the Roman or Byzantine, or ranges of tiny replicas of columns of one or other of the orders.

The Renaissance movement in Milan was about half a century later than in Florence, having, in fact, been introduced there by Florentine artists. In Venice the style was still later in appearing. The Venetians at this period were well satisfied with their architecture, and well they might be, for, as we have seen, the Gothic style, tinged and enriched by Byzantine influences, had procured buildings of exquisite beauty and design. The security and prosperity of the city rendered such fortress-like architecture as that of Florence unnecessary; moreover, there was a state of war between the Florentines and the Venetians, and the two cities hated one another cordially. It is not surprising, then, that Venice should be slow to borrow her forms of architecture from her neighbour. She adopted the style somewhat reluctantly, through Lombardy, and not directly; at first in small details, grafted upon the Gothic forms, as in the Porta della Carta of the Doges' Palace. The design of this gateway is wholly Gothic in composition, but the mouldings, and the sportive Cupids appearing amidst the foliage, are

Classical suggestions. In the internal quadrangle the Renaissance forms are more evident, mingled with the Gothic pointed arches.

In the delightful little church of S. Maria dei Miracoli, one of the earliest examples of the new style, we see the influence of Byzantine tradition (86). This influence is suggested, externally, in the cupola and the semi-circular roof and pediment, all of which would seem to be borrowed from the neighbouring S. Mark's. Externally, the walls are marble panelled, and inside too they are incrusted with an inlay of coloured marbles. The façades of the School of S. Mark, and of S. Zaccaria, show features manifestly borrowed from the same source.

Under the strong influences of the Byzantine, and of the characteristic Venetian Gothic, we find, as would be expected, a great divergence from the Florentine model in the Renaissance palaces, which are chiefly found along the banks of the " finest curved street in the world," the Grand Canal. The Spinelli Palace (1480) is a good type of the Venetian building. Here the façade has three well-defined stories, crowned by a fine cornice. The lowest story has a central door, with steps leading down to the canal; on the first, or principal, floor is a balcony, an almost indispensable adjunct. The windows are grouped irregularly, in a manner common to most Venetian palaces, the central ones being massed together, while those on either side stand free—a notable improvement upon the monotonous spacing of the Florentine and Roman palaces. The Vendramini Palace (1481) shows similar features.

Rome during the greater part of the fifteenth century was stagnating, and Renaissance architecture made practically no headway there. But in the first half of the sixteenth century so great an impetus was given to the Renaissance movement that this short period witnessed its culmination in the city. The causes which contributed chiefly to this result were the succession of the strong and ambitious Julius II. to the Papal chair, and, with his accession, the great increase in wealth and power of the Church in Rome. Wealthy families, whom the troublous times of the preceding century had driven out, returned to the city, and soon began to vie with one another in palace-building. Among the architects the new style found a great exponent in Bramante, who became to Rome what Brunelleschi had been to Florence.

Bramante appears not to have been an especially original genius; but he had, before coming to Rome, the advantage of profiting by the originality of his predecessors in Florence and Milan. His work is marked by great variety of treatment, and, in general, by simplicity and good proportions. One of his earliest designs, the Palazzo

Cancellaria (1495) has a simple façade rather monotonously treated, with strips of pilasters spaced in pairs between the windows. The arcading of the courtyard shows a composition of arches and columns, borrowed from the Florentine architects—the " Florentine " arcade, referred to previously—which was extensively used in the earlier Renaissance, though now frequently replaced with the Roman type, in which the arches are enframed completely by the order.

These columns, by-the-bye, like so many other details of Roman buildings, have a strange history. They are monolithic shafts, and originally formed part of the great theatre of Pompey—the first stone theatre of Rome, built about 55 B.C. During the Middle Ages that building suffered the usual fate, and was used as a quarry for stone and marble, from which the basilican church of S. Lorenzo in Damaso—not to be confused with S. Lorenzo Outside the Walls, a much more famous church—was almost entirely built. Bramante pulled down the greater portion of the basilica and rebuilt it in connection with the Palazzo Cancellaria, using fifty of the old columns, amongst other materials, for his two-storey courtyard arcade. The whole great building was erected at the order of Cardinal Riaro.

Before turning to Bramante's work at S. Peter's, we must spare a word or two for other famous buildings and equally capable architects of this central period. The Cancellaria palace is unusual for Rome in having façades decorated with the orders; much more typical is the Palazzo Farnese (1517–80) perhaps the finest of all the square-built palaces of the Italian Renaissance, the lower part designed by Antonio Sangallo, the Younger—there were two other architects of similar name—to which Michelangelo added the top storey and the magnificent cornice (88). The severe, sheer walls are relieved by little but the horizontal tiers of closely-spaced, enriched windows and the strips of rustication at the angles. Hundreds of Roman palaces are of similar design; neither wholesale rustication nor columnar enrichment were favoured there. There is, however, one other notable exception—the Palazzo Farnesina, (1507) a two-tiered, pilastered building by Peruzzi, an architect of great distinction, though modest and retiring and far less favoured in his own day than the pushful Bramante. He was an originator, which Bramante was not, a most skilful planner and endowed with a taste and artistic discretion far superior to his contemporaries. He died at a comparatively early age, and it has been suspected that he was poisoned by his jealous competitors.

Peruzzi's work shows that he knew and appreciated the qualities

which distinguish Greek craftsmanship from its coarser Roman imitations, and we find such qualities exhibited in his own buildings. The Farnesina has a new kind of plan arrangement, with boldly projecting wings instead of the customary courtyard; and the introduction of windows into the deep upper frieze is another of the many innovations to be credited to him. His most famous work is the Palazzo Massimi, a double palace comprising two residences, built in 1529 for the brothers Pietro and Angelo. The plan is most ingenious; despite the irregularities of the site and a curved frontage he has contrived harmonious dispositions of rooms around two inner courtyards, in character reminiscent of the best kind of ancient Pompeian house. He has, in fact, done full honour to his clients' proud claim to be of direct Roman patrician descent, in devising a mansion based upon the finest ancient precedents. Inside and out, the architectural details have a Grecian subtlety and refinement. Peruzzi did much other work too, at his home town of Siena, where his genius for planning and in achieving fine architecture with simple means is abundantly demonstrated in the Casa Pollini, an unpretentious palace built of brick, terra-cotta and a little stone.

Peruzzi and Sanmicheli, a Veronese, both were famed as military engineers as well as architects. Peruzzi designed fortifications at Siena; Sanmicheli for the Papal States, Venice and Milan. Sanmicheli achieved international renown in this field and invented a defensive work of first-rate military importance, the pentagonal bastion. Military practice had its effect upon the character of his architecture, which is distinguished by a masculine force and vigour, bold in its proportions, strong, sturdy and sometimes severe. Often he reduced mouldings to their simplest essentials and made great play with rustication. The placing of columns in pairs instead of singly is typical of his designs and he introduced the practice of "rusticating" column shafts and pilasters; a practice later adopted by the French architect Philibert de l'Orme to create what he called the "French Order" and claimed to have invented. There are many buildings by Sanmicheli in Verona—including several massive gateways—and one in Venice. His palace designs are often of two instead of three tiers, as for example, the Palazzo Pompeii, Verona, the lower part of which is heavily rusticated and the upper part decorated with the orders. A note characteristic of him is the embellishment of the keystones of arches with sculptured human heads, suggestive of Etruscan work.

Almost at the opposite extreme is the quality obtaining in the

91. THE FARNESE "CASTLE" AT CAPRAROLA, NEAR VITERBO

G. B. Vignola, Architect

92. THE VILLA CAPRA, VICENZA

Andrea Palladio and V. Scamozzi, Architects

93. S. MARIA DELLA SALUTE, VENICE

B. Longhena, Architect

architecture of the Florentine, Sansovino, sculptor rather than architect, who practised mainly in Venice, where he had fled at the sack of Rome in 1527, after working there for a while. Sansovino introduced the full Classical style into Venice, but this was the accident of circumstances and not an indication of originality, for he was not markedly inventive; he borrowed ideas quite freely from the work of Peruzzi and Sanmicheli. His architecture has a grace and richness which confirms that his prior interest lay in sculpture rather than architecture. His best building is undoubtedly the Old Library (1536–53) of which the gleaming marble façades lie between the famous Piazza of S. Mark's and the mouth of Grand Canal (85). It is sculptors' architecture *par excellence* and as such, is great, but in the true architectural sense is ordinary. For once in his career, the architect here made an original experiment, in attempting to use, internally, a shallow elliptical vault. It collapsed, and the designer was both fined and cast into prison for his error. Ever a borrower, Sansovino drew inspiration, too, from Michelangelo, whom he knew and admired, and the work of the two has the special importance that we find in it the first signs of the coming emancipation from ancient Roman architecture. Before the end of the sixteenth century the Italian architects were fully embarked upon that luxuriant, ornate and superficially brilliant style which we know as the "Baroque", a phase which, although it embraced much that was fantastic, insincere and absurd, yet produced sparkling gems of the first water. Garden and civic art, to which its profusely varied decorative forms were highly suited, were developed in highest degree, attaining a magnificence acknowledged, admired and imitated in the following years by the rest of the western world.

But we must hark back a little, to pick up the threads of the history of the greatest church of Christendom, chief monument of the Italian Renaissance and Baroque.

Bramante's work culminated in the great design of S. Peter's. Julius II. had employed Michelangelo to design a colossal monument for himself, and the ambitious pope next set his mind upon the erection of a vast mausoleum to cover the monument. Bramante was entrusted with the work, and began his great task in 1506. His design took the form of a Greek cross—a cross with four equal arms—with an apsidal end to each arm, and a dome over the crossing. The haste with which the work was carried on led to a threat of collapse of some of the main walls, a catastrophe which was followed by Bramante's death in 1514. After this the original design underwent many variations in the hands

of a succession of architects—Raphael the painter, Giuliano da San Gallo, and Peruzzi, among others. Each of these devised a new plan and made fundamental alterations to the original scheme, so that little real progress was made with the structure for many years. At last, after a chequered career, the building was handed over in 1546 to Michelangelo, then more than seventy years of age. Under his energetic control the work progressed without interruption for eighteen years. He reverted, in the essentials, to the original plan of Bramante, a Greek cross, but with a square projecting portico to the front, and with the mighty dome over the crossing. With such energy did he prosecute the work that, at his death in 1564, the design was completed, with the exception of the east front and the dome covering (90). He left behind him a complete model of all the unfinished parts, which were completed under Vignola, Giacomo della Porta, and Fontana, before the end of the century.

So far, the design of Michelangelo, based upon that of Bramante, had been adhered to with little variation: but in the seventeenth century Maderna, the architect to Pope Paul V., set himself the task of improving upon it. He added two bays to the nave—thus transforming the plan from a Greek into a Latin cross, and destroying the proportions—and he erected the existing façade, which, although it reflects Michelangelo's earlier work fairly closely, completely shuts off the view of the dome from the front. The imposing colonnade—austere and grand, despite its Baroque date—which encircles the piazza, was added later by Bernini (1655–1667).

S. Peter's dome is finer than that at Florence, but never would have been possible had it not been for Brunelleschi's lead. It follows his scheme very closely; it has almost exactly the same span (about 138 feet), and is similarly bound about by iron chains to prevent its splitting outwards. These did not, in fact prove sufficient, and others had to be added in the middle of the eighteenth century. The one amazing new feature is that the dome stands upon four massive piers, arranged as points of a square, and not upon a more or less continuous wall of supports of a corresponding plan form as does the octagonal dome of Florence Cathedral. The transition from square crossing to circular drum and dome is effected by the aid of pendentives, as originally devised by the Byzantines.

S. Peter's, thus completed after an interval of 160 years, is the largest church in existence. The vast central aisle, nave, and choir, almost 600 feet in length, are divided into only six bays; the nave itself has

four bays only. Over the crossing of the transepts hangs the great dome, 140 feet in diameter, rising to a height of 400 feet. With so few parts, in a building of such colossal dimensions, it follows that all the parts must themselves be on a vast scale. Internally there is nothing to give scale to the building, and to enable the eye to form an estimate of the size; there is no multiplicity of parts, as in a Gothic design, to confuse the eye, and so increase the *apparent* size. Herein lies a serious defect in the design. " Rome disappoints me much; S. Peter's, perhaps, in especial," wrote Clough, and this impression of S. Peter's must be shared by almost every visitor, for the colossal scale of the interior, in the absence of smaller details, is lost upon the observer. Externally, Maderna's façade (1612) too, is vast in proportions and theatrical besides, in the taste of the day; but from a distant point of view the mighty dome, dwarfing all other buildings, and seemingly suspended in mid-air, is an impression that can never be forgotten. " There's a kind of miracle in it. Go where you will, that dome follows you. Again and again, storm and mist may blot out the rest—that remains." And it is perhaps only in this dim, blue distance, when one is enabled to contrast the great mass with the surrounding buildings, that the mind can fully gauge the immensity of this great work of Michelangelo.

The story of the building of S. Peter's carries us down to the seventeenth century. During the 150 years that the work was in progress, Renaissance architecture passed through various phases. From the middle of the sixteenth century several architects wrote books upon the Classical orders, and those of Vignola and Palladio among them had great influence upon contemporary architects and still greater importance in diffusing the principles of Classical architecture in western Europe and beyond. Many were the notable buildings designed by the great architects of the time, especially by those we have named—Peruzzi, Sangallo, Sanmicheli, Palladio and Vignola; Michelangelo and Sansovino, too, whose richer styles early carried hints of the approaching Baroque. Until about 1580, the sixteenth century work was firmly based on Roman precedent, but though studiously correct and simple in detail, it was not slavishly imitative; all kinds of new and original arrangements were devised; even Palladio and Vignola did not follow their own written precepts rigidly. Vignola in particular was highly inventive and produced buildings of marked originality in a very wide range of types. He was the creator of several delightful designs for villas—that of the Pope Julius II, at Rome, and the Villa Lante at Viterbo have an intimate perfection not equalled in that day or since—

and his Palace at Caprarola, a veritable fortress in character, dimensions and plan is perhaps his most admirable and certainly his most competent piece of work (91).

Palladio had less scope for his original genius, but he made magnificent use of the chances he had. He contrived grand effects by simple means and with homely materials. In palace design, he made frequent use of a method of treatment, hitherto rare, in which a giant order embraced two or three tiers, and popularised an arrangement in which an arched and two smaller openings are framed within a pair of columns and their entablature—" the Palladian motif ", as it is commonly called. Palladio was not the first to introduce these treatments, but they were made familiar by one of his books, published in Venice in 1570, which was widely read in England and greatly influenced our architecture in this direction; whilst Vignola's book, published in 1563, was the more widely accepted in France.

Two expecially notable among Palladio's works, both at Vicenza, were the Villa Capra (92), which deeply impressed visitors later on, and the so-called " Basilica Palladiana ", this the old Gothic town hall around which he had designed a double-tiered portico. The latter building firmly established the popularity of the Palladian motif, here used in both the tiers. Palladio was responsible too, for important developments in theatre design, to which Peruzzi already had contributed the invention of movable scenery. No Italian architect has left his impress so strongly upon English architecture as Palladio. Possibly his influence was, in part, due to the fact that he taught, better than any one else, the method of obtaining good effect cheaply and simply—that he could make a design " grand without great dimensions and rich without much expense," by the somewhat unworthy use of plaster or stucco with which he coated his buildings. As a reaction from this severer style the Renaissance in Italy ended by combining the picturesque with Classic architecture itself; the blend of these produced the Baroque style. " Other architectures, by other means, have conveyed strength in repose. These styles may be grander and of an interest more satisfying and profound. But the laughter of strength is expressed in one style only—the Italian baroque architecture of the seventeenth century."* The Baroque still holds its place as the architecture of pleasure—of the garden and the theatre.

Here, we have used the term " Baroque " to describe a period of

* Geoffrey Scott: " The Architecture of Humanism."

Italian architecture, from roughly 1580–1750, but it sometimes still is employed in reproach or scorn to castigate excessively ornate architectural works which disregard the strict rules of the Classical style, in whatever country they may occur. Certainly there were many tastelessly florid buildings erected in Italy within the period, and the fact may well have led to the coining of this disrespectful term to describe the whole. It is not known when it was first used. Yet we have to be on our guard against the looser usage, for very many of the finest Classical monuments are indisputably of the Baroque period, and so far from being chaotically extravagant they are dignified, grand, spaciously conceived and orderly in the extreme. S. Peter's at Rome (substantially) and S.M. della Salute at Venice (93) both are truly Baroque. Comparable are the " Superga " at Turin (1717) and the Church of the Madonna di S. Luca, near Bologna (1730) among the many others which might be instanced did space allow; and outside Italy, there is the magnificently sited monastery at Melk, perhaps the most superb of Austrian buildings, though merely one of a galaxy of works in that country directly inspired by Italian precedent (99). We shall see too, that some among the greatest monuments of France and Britain, the churches of the Invalides, Paris, and S. Paul's in London, for instance, owe their being and their essential qualities to the parent Baroque.

Throughout the progress of the Italian Baroque, the influence of the purist school of Palladio and Vignola ebbed and flowed, but, oddly enough, it was foreign revolt in France and England against the excesses of the style which in due course reacted to sober the exuberance and abandon which characterised so much of the seventeenth century Italian work. In the earlier eighteenth, Italy definitely lost her long lead in architecture and the arts, and increasingly thereafter, mirrored contemporary developments in France, and via France, England. First observable about that time, a renewed impulse towards antiquarianism swept across western Europe, eventually to have profound effects upon architecture and the arts, a movement stimulated by the discovery of the buried cities of Herculaneum (1719) and Pompeii (1750). This archaeological phase had similar consequences in the three countries, producing first a diversion of the Classical style towards Roman precedent, but soon, increasingly towards the Greek. These new trends are notable in the latter half of the eighteenth and the early nineteenth centuries. The Renaissance style commonly is held to have terminated about 1830 in the major countries of western Europe, as

thereafter, revivalism splits architecture in the parallel practice of differing styles based archaeologically on the Roman or Greek—not to speak of the maintenance meanwhile of the older, Renaissance vein—and, notably in England, the Gothic as well. There were other minor styles practised too; but we shall speak of all in a later section.

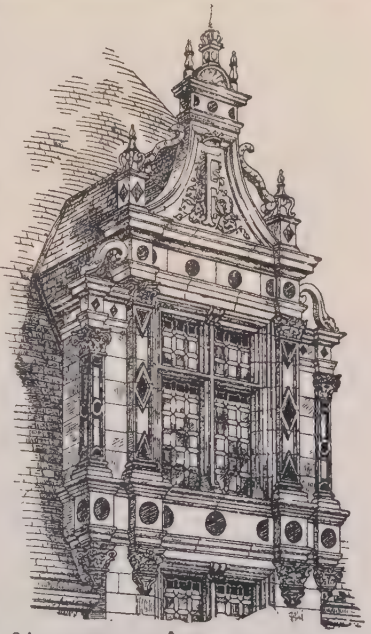
FRANCE.—While the Italian architects were busily reviving the old national architecture in their own country, the Gothic style in France was vigorous and full of vitality; and for a long time the Renaissance movement had no effect upon it. But at the end of the fifteenth century, when the wars of the French kings brought them into contact with the Renaissance palaces of Italy, the monarchs became fired with ambition to imitate these splendid residences, and brought back in their train several Italian architects, whom they employed to reproduce, to some extent, the great palaces of their own country. In France, however, the foreign artists could not have things their own way. They introduced many Classical details, but the national Gothic traditions were very strong, and for a long time only the minor details could be introduced, while the general plan and composition of the designs continued to be unaffected.

There ensued, then, a long period of transition, when Classical details were grafted upon Gothic designs, in the way we find them at the Château of Blois. Here the portion which was built for Louis XII., about 1500, shows a curious blending of the styles: the general impression is of a Gothic building, but the new influences are distinctly seen in the mouldings and in the strongly emphasised horizontal lines. It was not until the reign of Francis I. (1515–47), when the new architecture became fashionable, that the Classical forms began to assert themselves and to dominate the design. The beautiful Transitional work of this period, the " François Premier," as it is called, is full of charm, differing from the Renaissance of Italy in three characteristic features, as the result of the influence of Gothic tradition in France. These special features are (1) a picturesqueness of composition and of outline; (2) the steep-pitched roof, with the natural development of dormers and high chimneys; and (3) lack of symmetry and of formality of plan.

The best examples of the François Premier style are the palaces built by the king himself—the north wing of the Château of Blois (1515–30) with its famous external staircase, the great palace of Fontainbleau, and the Château of Chambord. At Chambord (1526–44)

we find greater formality of plan than was usual during the earlier period, and an elaborate roof—almost overweighing the design—with a multitude of dormers (94) and tall chimneys, crowned in the centre with a fantastic lantern.

At Chenonceaux, Azay-le-Rideau, and elsewhere dotted throughout the district of Touraine, the delightful châteaux of the nobility bear witness to the memorable times when Francis held his court on the banks of the Loire. In most of these, as also in the Château of Mesnières, near Dieppe, we find the same characteristics—steep roofs and elaborate dormers, angle tourelles, and emphatic horizontal string-courses and cornices. The greatest undertaking of the reign, however, was the rebuilding of the Louvre in Paris, which was put in hand about 1545, shortly before the death of Francis. Serlio, an Italian, had been consulted about the designs, but the work was entrusted to a French architect, Pierre Lescot, under whom a part of the original palace—built around a vast courtyard—was erected. The work progressed throughout various reigns down to the time of Louis XIV. (1660), the building growing ever larger, and was not actually finished until the middle of the nineteenth century, when Napoleon III. added the north and south façades, which joined the Louvre to the site of the former palace of the Tuileries, destroyed by fire in 1871. Thus completed, the Louvre is the most extensive of all European palaces, and supplies an excellent record of the progress of French Renaissance. Lescot's design has two main storeys, with Corinthian order of pilasters below and composite above; over these is a low attic storey. Some of the sculptured work, by Jean Goujon, is especially good. The well-known imposing Corinthian colonnade of the east front, almost 600 feet in length (1667–74) (98), was the work of the court physician Perrault.



94. DORMER, CHÂTEAU OF CHAMBORD

Another building of the early period was the Hôtel de Ville in Paris, begun about 1550 from the designs of an Italian, but since destroyed by fire. In the great palace of the Tuileries, designed for Catherine de Medici by Philibert de l'Orme (1564), several features were introduced for the first time in French architecture; two of these—the bands of rustication carried at intervals across the columns, pilasters and walls and the broken pediments of the attic story crowned with statuary—became specially characteristic of later French Renaissance. We saw earlier, that an arch enframed by the banded order, as introduced here by de l'Orme, constitutes the so-called French Order (96). The introduction of the broken pediments, in imitation, perhaps, of Michelangelo's work in the Medici chapel at Florence, was probably due to Catherine's suggestion. Be that as it may, the idea found favour with the French, and the feature has remained popular with them almost to modern times.

Towards the end of the sixteenth century the architecture had lost much of the early charm of the Transitional period, and many of the buildings of Henry IV. (1589–1610) are coarse in detail and inferior in design: the least interesting portions of the Louvre date from this period. Great play was made with rustication, which took on a variety of novel forms. Rustication long remained a characteristic feature of French Renaissance Architecture, though never again so extensively used as at this time. In the following reigns of Louis XIII. and XIV. (1610–1715), true Classical principles, such as distinguished the mid-Renaissance in Italy, took progressively firmer hold, at the expense of those due to a welter of influences which temporarily had debased architectural taste. The work of the time is at its best in the Orleans wing of the Château of Blois (1635–40) and the Château of Maisons (1642–1650) near Paris (97), both by F. Mansart, and none is more typically French. The high-pitched roofs, separately gathered over pavilion projections, superposed orders matching each of the floor tiers, large windows, almost complete absence of unadorned wall-space—these are features which distinguish the French from the parent Italian style, of which they are adaptations occasioned by differing traditions and conditions. Somewhat similar to Maisons is the central block of the Palace du Luxembourg (1615–24), preceded by a *Court of Honour*, this embraced by two-storey wings and closed by a front entrance screen, with a central, towered gateway within it. The Luxembourg Palace is impressively rusticated, in direct imitation of the garden front of the Pitti Palace at Florence, a work by one of the

95. THE PETIT TRIANON, VERSAILLES
J. A. Gabriel, Architect

96. ARCADE SURVIVING FROM D' L'ORME'S PALACE OF THE TUILERIES

97. THE GARDEN FRONT, CHATEAU OF MAISONS

F. Mansart, Architect

98. THE LOUVRE, PARIS: EAST FRONT

Claude Perrault, Architect

more virile of Italian Baroque architects, Ammanati, built between 1558–70.

The vast and historically famous palace at Versailles, surrounded by prodigious expanses of formal gardens, laid out between 1662–88 by Le Nôtre, most famous of French garden designers, architecturally is drab in the extreme. A small earlier palace here was extended at enormous expense—and submerged in the process—between 1678–1710, by J. H. Mansart, for Louis XIV. Part for part it is not without merit, but the endless repetition makes it singularly dull. By the same architect, but a more successful design, is the Hôtel des Invalides in Paris (1692–1704), with a great central dome like that of S. Paul's in London. The lofty external cupola is constructed of wood covered with lead; the true dome, of stone, is built on a smaller scale inside. In all these designs of the mature Renaissance it will be noticed that there is greater formality, symmetry, often stateliness of design, and consequently, of course, a lack of the picturesque charm of the earlier period. That one special feature of the Gothic style, however, was always retained in the French buildings—the steep-pitched roof; and in the seventeenth and eighteenth centuries the massive " Mansard " roof formed a very prominent feature in the design.

French seventeenth and earlier eighteenth century architecture takes its inspiration mainly from contemporary Italian architecture, that is to say, from the Baroque, but nevertheless, maintains its own quite distinctive national traits. In design it rarely is so wildly extravagant as the common run of Italian buildings of the time, unless in interior decoration, where it usually is equally heavily ornate. French designers strike a balance, as it were, between the licence of the true Baroque and the rectitude of the school of Vignola or Palladio, and indeed, in the later stages of the period it is possible to resolve French buildings into these two classes.

Quite early in the eighteenth century the reaction towards the strict Classical rule becomes dominantly strong, and though buildings still have much of the grandeur and expansiveness of the Baroque, they commonly are sober and restrained. In the first half of the century too there begins that phase of archaeological enquiry of which we have spoken earlier (in the Italian section); thus whilst one eighteenth century group of architects is interpreting the " Vignolan " Italian manner, another and increasingly large group is exploiting the antique Roman, and soon, Greek. Most monuments of the latter part of the century are at one and the same time grand and severe. Characteristic of all,

now, is the use of the giant order instead of the multiple tiers of earlier times, and in this connection Perrault had given the lead in his additions to the Louvre (1667–74) (98), a work which foreshadowed eighteenth-century design and one which carried considerable later influence. Interior decoration however, remained relatively ornate, but grew ever more intimate in scale and chaste in taste. As in England at the same time—and French architecture and garden art now owed quite a little to English influence—there is a glowing delicacy, refinement and charm, especially in domestic interiors, never equalled at any other period, before or since. Incidentally, the term " Rococo " often is used to describe the later eighteenth-century style of decoration in England and France, and in general, to indicate the refined, delicate and graceful latter-day version of the Baroque. Actually the two words mean the same thing, the one is Italian and the latter French, but it is convenient to use them with these differing meanings.

In garden design, the grand and stately formal lay-outs, such as planned by Le Nôtre for Versailles, remained the rule for a while, but by mid-century, contemporary English ideas began to take hold, and initiated the cult of the picturesque, in which natural peculiarities were stressed, exaggerated or imitated, and all straight lines abhorred. Civic design, on the other hand, continued to develop apace along the former, formal Classic lines. Examples are numerous, but the most famous instance is that of the Place Stanislaus, with all its subordinate squares and buildings (1750–7) at Nancy, by Héré de Corny. The finest buildings of the time nearly all are formally related to the streets, squares or gardens about them, as, for instance, the twin palaces flanking the Place de la Concorde—formerly Place Louis XV.—built in 1761–70 by J. A. Gabriel. This architect was author of several important works. He added to the Palace of Versailles, incidentally contributing his quota to the monotonous effect; but at Versailles too, screened in the depths of the vast gardens, is the architectural gem of the day, the Petit Trianon (1762–8) designed by Gabriel for the retiring Louis XV. and presented by the king to Madame du Barry (95). This modest building, about 75 feet square, is a masterpiece of French art, inside and out, and related too, to a delightful, intimate garden, with terraces, lawns, fountains, pool and a charming octagonal music pavilion—though the latter was from the design of Gabriel's father, Jacques Jules, built in 1705. Art, architecture and craftsmanship are most happily wedded in this superb design.

Worthy to rank among the great domes of the world is that of the

Pantheon at Paris (1757–90) by Soufflot, though it is rather smaller—at 68 feet span—than that of the Hôtel des Invalides (72 feet) and much more so than S. Paul's (102 feet) or S. Peter's (138 feet). The church has a Greek cross plan, but has not the fine pyramidal composition of the Invalides, as the arms are longer and that at the west is further extended by a deep portico (89). The dome is triple and is unique in the respect that all three shells are of masonry—the domes of S. Paul's and the Invalides similarly are triple but the outer covering is timber, lead covered. All the masonry vaults are daringly thin and light; at points the thickness is no more than twelve inches. There are domical vaults over each of the four arms of the church, and these are buttressed astride the double aisles, behind a sheer, high containing wall which lacks windows, as light is admitted clerestory-fashion, behind the upper part of the screening wall. The sparing simplicity of the external design with its be-columned portico and peristyled dome contrasting strongly with the blank expanse of the walls elsewhere, is strikingly effective.

French Renaissance architecture came to a close—so far as conventional classification goes—with the so-called " Empire " style (1790–1830), distinguished by the monumental simplicity of exteriors and the rich but rather chilly elegance of interiors. Archaeological interest and inquiry had intensified meanwhile. Very typical works are the portico of the Chambre des Députés (1807), by B. Poyet, and the Madeleine church, as existing, designed by B. Vignon about 1807 but not completed until after his death. The latter is the supreme example of the antiquarianism prevailing, for externally it is a pagan temple in all essentials of design. The exterior gives little hint of the fact that inside, the roof vault is comprised of three shallow domes, carried on pendentives in Byzantine fashion. The Madeleine was built to the command of Napoleon as a " Temple of Glory ". A more orthodox type of church is S. Vincent de Paul (1824–44), by Pepere and Hittorf, with a twin-towered western front and columned portico. Well-proportioned and almost painfully correct in its Classical detail, it is also repellingly cold and austere. The Arc du Carrousel (1806) is another instance of an archaeological exercise, for it almost exactly reproduces a Roman triumphal arch. The famous Arc de Triomphe (1806–36), grand and spectacular, is a composite work by several architects, but perhaps mainly due to J. F. Chalgrin.

GERMANY.—German Gothic practices did not grow from native Romanesque precedents, but were inspired directly from the full-

fledged French Gothic, from about mid-thirteenth century on. Late in the day too, the Renaissance penetrated there; borrowed from the same French source, about the time of Henry IV. (1589–1610), in the parts nearest the French border. The French style of the day, we remember, was itself scarcely mature, made up of abundant small parts of a coarse and heavy character. Northern German Renaissance clumsily imitated and exaggerated these characteristics. At its best the German style was quaint and picturesque; ordinarily, it was tastelessly elaborate—much compartmented and profuse with carven strapwork, convoluted ornament and serrated, spiky gables. There were many local variants, owing to the incoherent political subdivision of the country into innumerable kingdoms, principalities and states, in varying degree subject to the several dominant royal houses; a situation giving rise to complicated cross-influences. The work of the Early Period, i.e. of the later sixteenth century, nearly all of it represented by additions to Gothic structures, is particularly naïve and crude in its multitudinous architectural and sculptural details. Heidelburg Castle is typical; this a rambling mediaeval building to which several successive Renaissance additions were made in the sixteenth century, extravagantly ornamented and contrasting strangely with the much more sober and simple older parts. The Rathhaus Portico, Lemgo (1550), and the Gewandhaus, Brunswick (1590), are instances of similar kind, though rather more formal and a little less oddly quaint than most. Throughout and well beyond the sixteenth century, buildings still retained the mediaeval traits of general arrangement, and even of features or ornament, as, for instance, the Marienkirche at Wolfenbüttel (1608–23), which is almost completely Gothic, buttresses and traceried windows and all, apart from a veneer of Classic miniature orders, mouldings and ornaments. The admixture is even more odd in the case of a church at Bückeburg (1613), which though arranged in entirety on traditional mediaeval lines, inside and out, is lavishly decked with luxuriant ornament of a remarkably advanced German Baroque character.

All these examples are from the northerly parts of the country. The Thirty Years War (1618–48) threw the German arts out of gear, and afterwards, the tale is taken up in the south (including Austria), in those parts neighbouring to Italy, from whence influences then were received direct. Hereabouts there developed a much more distinctive and progressive style, evolved spontaneously from the Italian Baroque and eventually converted into an equally individualistic version of the

99. THE MONASTERY AT MELK

J. Prandtauer, Architect

100. THE KARLSKIRCHE, VIENNA, PORTION OF THE PRINCIPAL FAÇADE

Fischer von Erlach, Architect

101. S. PAULIN, TREVES

J. B. Neumann, Architect

Rococo strain. The pomposities of the Baroque proved admirably suited to the popular taste in these parts, and well matched the lofty aspirations of the German Emperors, the Hapsburgs, heirs of the Holy Roman Empire, who held their brilliant court at Vienna. Tremendous sums of money were lavished on vast palaces, monasteries and churches, and grand formal gardens, in the hundred years or so concluding about 1750. In this period, the peak of activity was reached in the earlier years of the eighteenth century.

Italians were at first largely instrumental in carrying Baroque art into the southern territories; and these came from north Italy rather than from Rome, for the creative Italian centre passed from the ancient city to Lombardy and Piedmont after about 1670. Great German architects in due course emerged. There are several famous names; greatest of all, perhaps, was J. B. Fischer von Erlach (1656–1723) who worked principally at and around Vienna and at Salzburg; and there were also, J. Lukas von Hildebrandt (1666–1745), who collaborated with Fischer von Erlach on occasion but built also at Prague—the latter a town rich in Baroque buildings—and J. B. Neumann (1687–1753), employed principally at Würzburg. Fischer von Erlach had an extremely busy life and designed very many buildings. His earlier works have all the robust grandeur of the high Baroque, rich and strong in their rhythms and quite free of the petty and meaningless frivolities which had debased earlier German architecture in the north. Later on, his style became more elegant and restrained, tending towards the luxurious refinement of the Rococo. His University church at Salzburg, for instance, one of his earliest designs, is as brilliantly and powerfully modelled as anything that Rome had produced. The same may be said of the Karlskirche, at Vienna (100), a work of his maturity, and perhaps his best; though choice is difficult in view of his high versatility and facility of artistic invention. His additions to the Hofburg, at Vienna, on the other hand, are extremely flat and dull—but perhaps this character is due to the fact that though the building was designed by him, it was not carried out until after his death. There is no doubt at all as to what constitutes Hildebrandt's masterpiece; it is The Belvedere, or Summer Palace of Prince Eugene, in Vienna (1713–16), a finely grouped and admirably decorative block of buildings which might well stand as representative of the German Baroque as a whole—set in a beautiful, highly artificial, formal town garden, equipped with almost every kind of artistic delight; fountains, statues, terraces and patterned shrubs and plants.

Fischer von Erlach made designs in 1696 for the vast Imperial residence of Schonbrunn, three miles or so outside Vienna. The grandeur of this conception is due to him, but the palace as it now stands was built after his death, between 1744–50, by an Italian, Niccoli Pacassi. Externally it is dull; inside it is resplendent with costly decorations. There are said to be nearly 1,600 rooms, including 139 kitchens. Some of the later decorations give witness of the antiquarian mood universal in Europe towards the end of the century. The immense park and formal gardens which surround the palace, with grand avenues, framed by clipped hornbeam hedges, thirty feet high, resemble those of Le Nôtre at Versailles. They were designed by a Dutchman, A. van Steckhoven, in 1753, and carried out about 1780–90.

Imposing buildings are many, throughout the length and breadth of these southern German lands. Vast projects were contemplated, and most were carried out, in whole or part. Monasteries were astonishingly large, the buildings often of palatial magnificence and scale. On the Danube there were four great monastic establishments, one of them, the abbey at Melk (1707–46), referred to earlier, is far famed for its grand and stately architectural qualities, enhanced by its felicitous setting on a craggy eminence, rising steeply some 200 feet above the river (99). The architect, J. Prandtauer, a local man and not especially famous among his fellows, also was the designer (along with others) of a second among these great Danubian monasteries, that of S. Florian; not less remarkable, if less spectacular than that at Melk. Local talent, so abundant at the time, is notable again at the church of S. John Nepomuk (1733–46) at Munich, by the brothers Asam, an unassuming pair who had greater brilliance than they or their contemporaries knew. To our northern eyes, this church might appear extravagant and bizarre in decoration as well as form, but its seeming theatricality of effect was admirably suited to the needs and tastes of the people for whom it was designed. Equally, we might find the church of S. Paulin at Treves (1734) over-rich to gain our immediate liking, though there is little unorthodox in its structural arrangement. It is an aisleless church, rather tall in proportions, with a western domed spire and an eastern apse (101). It was designed by J. B. Neumann, one of the three famous architects named earlier, and must serve us to represent his many fine schemes. It is extremely cleverly devised and particularly impressive in that the arts and crafts which have gone to its making are in such complete and close concord. Internally, it is aglow with colour and lively with the play of form; the vaulted ceilings

are frescoed with biblical pictures fading vignette-fashion into plastic cartouches and delicately modelled stucco ornaments; clustered pilastered piers, some with sinuous cornices, decorate the otherwise plain walls, which by their comparative simplicity, afford contrast and relief to the lacy filigree of the metal of the chancel gates and the coronetted altar canopy carried on sparse, slender columns. The colours of the ceiling frescoes are rich and deep; the architectural elements otherwise are tinted in soft pastel tones. Despite the vividness of the effect. there is nothing, anywhere, garish or crude. The fascinating brilliance of the Baroque is nowhere more satisfyingly displayed.

This German style seems well to represent the ultimate and logical end of the course of the Renaissance, begun first in Italy three hundred years before, for it owes little or nothing to any other source. It is homogeneous, and in its sphere, universal, for it served nobility and peasantry alike. The full tale of it is not told in the grander buildings of the towns alone; all buildings of the time, large or small, take their share and it is indeed, at its most delightful in the minor works of the countryside, their naïve simplicity touched here and there with the delicate decorative intricacies of the matured style. Flared spires, crowned with bulbous turreted domes, occur occasionally, and give an eastern note which offers the one hint of formative influences proceeding from elsewhere than Italy.

CHAPTER VIII

RENAISSANCE ARCHITECTURE IN ENGLAND

ENGLAND. For the guidance of the reader, we will first extend suitably the table of English periods given earlier, in the Gothic section. As the manifestations by which the successive sub-styles are recognised overlap one another quite considerably, there will be no detriment in giving the embracing dates in very round and readily memorable terms.

In the Gothic section we have used the title " Early Tudor " (1500–1550) to mark the final phase of the pointed style. As we shall see below, there were a few classical works already completed within this period, though there was no general change until the later half of the century. " Late Tudor " is synonymous with " Elizabethan ", a more familiar name for the earliest of the sub-titles of the Renaissance.

	Early Renaissance		
1550–1600	– Elizabethan		
1600–1625	– Jacobean		
	Mature Renaissance		
1625–1660	– Inigo Jones period	} Stuart	
1660–1710	– Wren period		
1710–1760	– Palladian phase	} Georgian	
1760–1810	– Antiquarian phase		
1810–1830	– Regency		

Gothic architecture, we have seen, had run its course uninterruptedly in England for many centuries, little disturbed by foreign influences. True, the " Tudor " Gothic of the sixteenth century was a somewhat degenerate form, but it was producing many fine buildings and the domestic mansions of the style—such as we find at Compton Wynyates, in Warwickshire (1520)—were well suited to the hospitable requirements of the time. It was natural, therefore, that there should have intervened, as in France, a long and interesting period of transition before the newly imported classical details could displace the older Gothic forms.

First hints of a coming change appear in the first half of the century in the form of minor decorative works, mainly due to Italian craftsmen

102. THE LONG GALLERY, HADDON HALL, DERBYSHIRE

From the drawing by John Nash, 1839

103. MONTACUTE HOUSE, SOMERSET: FROM THE SOUTH EAST

104. SOMERSET HOUSE, LONDON: RIVER FRONT

Sir William Chambers, Architect

105. WHITEHALL, LONDON: BANQUETING HALL

Inigo Jones, Architect

imported by Henry VIII. The Italians were not important artists in their own country but appeared brilliant in this because of the novelty of their style of design. The transition from Gothic to Renaissance did not begin in earnest until the reign of Elizabeth (1558), when the Court began to give much attention to Classical studies and to increase enormously the introduction of foreign artists and craftsmen; but now Flemings and Germans rather than Italians, and whose views of the Renaissance were very much second-hand, and as we have seen, second-rate. Consequently, they gave Elizabethan architecture an amateurish, hybrid appearance. Frenchmen, too, had their influence upon the Transitional style, for many Huguenot refugees fled to England after the massacre of S. Bartholomew in 1572. The presence of so many aliens led to a good deal of unpleasantness and even to riots. The native workmen complained then—as they have complained ever since—that the foreigners brought over numbers of ready-made articles, which they sold in this country, and thus lessened the amount of work to be done by the native craftsmen. In this way, in the first instance, foreign ideas and minor classical details began to find their way into the country. Perhaps the first important step in this direction, however, was the employment of the Italian artist Torrigiano, in 1512, to design the tomb of Henry VII. in Westminster Abbey, a design which he carried out in the style of his native country. Similarly an Italian would design, in his own Renaissance manner, a chimney-piece here, a monument there, so that the Classical forms became, as in France, familiar first through the medium of such accessories. The screen and stalls (1535) in King's College Chapel, Cambridge, are a fine early example of the new style. As Classical culture came more into vogue, books upon Renaissance art and architecture were translated from Italian into English, and were freely read. Under these influences the Gothic features tended to disappear, and a clothing of Classical orders began to adorn the wall surfaces and entrance doorways. Soon these became incorporated in the design, while the forms and details underwent a gradual change, as the builders came more and more under the sway of the new movement.

The noble mansion of Elizabeth's time, the familiar "Tudor-chimneyed pile of mellow brickwork" belongs to this Transitional period. In examining one of these buildings it is interesting to note how the Classical details gradually crept in, while the general Gothic disposition was at first unaffected. At Haddon Hall, Derbyshire, much of the building is mediaeval, of various periods, with a very fine

banqueting hall. On the first floor is a splendid "Long Gallery" (1567–54) itself a representative element of the Elizabethan larger house, and, too, admirably illustrating interior characteristics of the time, including that notable English feature, the great square bay-window, divided into smaller lights by a number of mullions and transomes (102). The influence of the Perpendicular Gothic is seen, too, in Hardwick Hall (1576–97), where the design is almost overpowered by the enormous windows, so that the rhyme:

Hardwick Hall,
More glass than wall,

seems to be literally true. The pierced parapet, which crowns the building, is a feature of frequent occurrence; in places we find it pierced into patterns; sometimes the piercing takes the form of a sentence or motto. At Hardwick the design shows the initials, E. S., of Elizabeth, Countess of Shrewsbury, who built the mansion. Wollaton Hall, Notts (1580–88), has an early example, in the parapet, of the fantastic "strap" ornament, a feature quite peculiar to English Renaissance. The angle tower of Wollaton in the illustration (105) shows also the free use of the three orders, and the method in vogue of clothing the wall surfaces with Classical details.

106. THE TOWER, WOLLATON HALL

Inside the Elizabethan mansions the prominent features were the broad, massive staircase of oak or, less frequently, of stone, and the great hall, panelled or hung with tapestry, with open timber roof, bay windows, and minstrels' gallery. In larger mansions a great gallery was often found on the first floor, extending, in some cases, the whole length of the building, as at Haddon Hall, already mentioned, and Montacute House, near Yeovil (103), where the gallery is 20 feet wide and no less than 170 feet in length.

Few mansions of the period are more interesting than Burghley House, near Stamford, built for the celebrated Lord Burghley. On the building there are several dates, ranging from 1577 to 1587, so that it probably took about ten years, between these dates, to build. Letters which have been found referring to the building, from Lord Burghley to the builders and workmen, throw some light upon the manner in which building operations were carried on in those days. Ordinarily, there were no drawings, except the roughest of sketches, and there was no architect in the sense we understand to-day. The employer arrived at his own views of what he required and gave his instructions in very general terms to each of the main trades to be engaged in the building work, each trade supplying its own designs, where these were needful, and an outline statement of what was to be provided. Sometimes the owner himself arranged for the supply of materials; sometimes the trade contractor. The present period is intensely interesting in this connection, for we have some evidence that the architectural profession was now beginning to emerge. Instead of relying solely upon his own conceptions, the owner sometimes sought ideas from persons who made it their special business to study building design, and who were not themselves directly connected with the processes of building or the provision of materials. These specialists made rather more definite drawings than had been done previously. One such person, named John Thorpe, provided the general design for Burghley House.

Yet still in almost all, if not all of the current work there was plenty of room for the expression of personal whim or taste on the part of the building trades; the builders and craftsmen were not hampered with restrictions, and were able to work very freely within the framework of their general directions, so that if any responsible craftsman had what he considered a happy idea he was free to embody it in his design. Thus we occasionally find quite childish freaks perpetrated. In an interesting collection of sketches and notes by John Thorpe, in the Soane Museum, London, there are some careful studies of the orders, and some plans and drawings of a house which Thorpe designed for himself. The plan of the building is in the form of the designer's initials, J. T., the two portions of the building being connected by a corridor. Beneath the plan he had written:

> These two letters, J and T,
> Joined together as you see,
> Is meant for a dwelling house for me.

Although in some of the more Classical designs the plans were symmetrical, in other cases the arrangement was quite fanciful. Montacute House, with its vast gallery, already referred to, showed a plan not uncommon in those days, in the shape of the letter E—perhaps a courtier's graceful compliment to Queen Elizabeth. But the courtiers took care, whatever the plan, that comfort was not sacrificed to appearance, believing, with Bacon, that houses were made " to live in, not to look on," and the interior arrangements were excellently designed to cope with the lavish hospitality which prevailed in the " spacious days " of Elizabeth. Very suggestive of the open houses are the legends often found carved amongst the ornament; thus, over the front entrance at Montacute: " And yours, my friends "; while round the garden porch run the words: " Through this wide opening gate, none come too early, none return too late."

Among other famous Elizabethan mansions may be mentioned Longleat in Wiltshire, Penshurst and Knole House in Kent—the latter remodelled in the reign of James I.—and Kingston House, Bradford-on-Avon.

During the reign of James I. (1603–1625)—the " Jacobean " period—Classical forms were used more freely than ever; or perhaps we should say, forms of Classical origin, for the details were so distorted and caricatured as to be barely recognisable. Audley End (1603–1616), erected by the Earl of Suffolk, in Essex, one of the most notable mansions of the period, is said to have been designed from a model brought from Italy at a cost of £500; but the style was so modified in transmission that, in 1669, we find Prince Cosimo's secretary—an Italian—criticising the design, and failing to recognise in it the architecture of his native land. " The architecture of the palace," he says, "is not regular, but inclined to Gothic, mixed with a little of the Doric and Ionic." If, then, a contemporary Italian failed to recognise the style of the period, though it had been introduced from his own country, it is small wonder that we find difficulty in tracing and accounting for all the forms and features. Certainly this Elizabethan and Jacobean work is one of the most curious and puzzling Transitional styles known in history. Buildings of the same date show an extraordinary diversity in both the amount and the character of the Classical features introduced. In some cases the designs are mediaeval buildings with the Gothic details left out, and a good deal of uncertainty as to what Classical forms should be put in their place. Evelyn, when visiting Audley End, noted it in his diary as a " mixed fabric betwixt ancient

and modern, and, without comparison, one of the stateliest in the kingdom"; and Samuel Pepys was puzzled by the architecture, but admired "the stateliness of the ceilings and the form of the whole, and drank a most admirable drink, a health to the King."

It was but natural that this confusion should end in a reaction, and a return to the more correct and dignified use of the Classical orders. The man under whose influence the disorder gave way, and who may be styled our first great Renaissance architect, was Inigo Jones.

Inigo Jones (1573–1652) had studied in Italy, especially at Vicenza, the birthplace of Palladio, where he came under the influence of that great master's work. Returning to England, after a second visit, he endeavoured to introduce the monumental style of Palladio, and this objective shows in his design for the Queen's House at Greenwich (1618–35), a simple, chaste building, two storeys high, with a rusticated lower portion and, on the main façade, a regularly spaced Ionic order above. With Inigo Jones, the English Renaissance at length arrived at maturity. The strong masculine qualities and the sober restraint which are the special English attributes, already are firmly established in his work. The church of S. Paul, Covent Garden (1631–8), was even more restrained and elegant; indeed so sparingly simple that "the handsomest barn in England" was a description not unfairly applied to it. His great opportunity appeared to have arrived when he received the commision to design an immense palace at Whitehall for Charles I. The designs for this great building, and the noble composition of the Banqueting Hall—the only portion erected—are sufficient to place Inigo Jones amongst the foremost masters of the Renaissance (105). The treatment of this façade, with its two rusticated storeys ornamented with pilasters and engaged columns, is suggestive of Palladio, who frequently superimposed his orders as well sometimes as grouping two storeys under one comprehensive order.

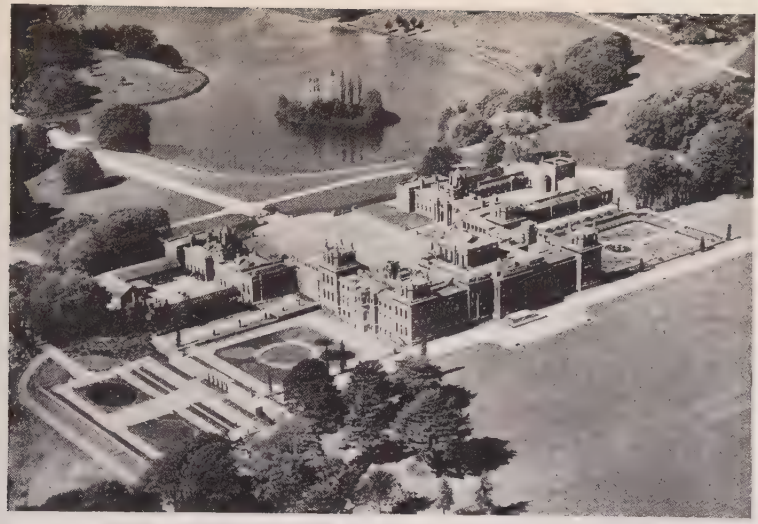
The number of buildings now surviving known definitely to have been the work of Jones is not great, but there are many, mostly large houses, which on various grounds are attributed to him or said to be from his designs, though executed by others. He is thought to have had some hand in the design of the south porch of S. Mary's, Oxford (1637), an extremely gracious and beautiful work; but if it is his, it differs greatly from his usual architectural style, for its "corkscrew" columns and scrolled and sculptured pediment are emphatically Baroque and not Palladian. Yet the York Water Gate (1626), much more certainly designed by Jones, is unorthodox too, in the same sense,

and shows him not to have confined himself exclusively to the stern and exacting principles of Palladio. The York water gate was boldly modelled, as befitted its intended use as an entrance from the Thames to the old York House. It was carried out by Nicholas Stone, primarily a sculptor. Jones and his followers, among whom John Webb (1611–74) was another notable, securely established the mature Renaissance in England, though for a time yet, much work continued to be done in the older hybrid, transitional style.

More fortunate in his opportunities than Jones was his great successor, Sir Christopher Wren (1632–1723), the great central figure in English Renaissance history, who left his impress so unmistakably upon the new London which sprang up after the great fire. Wren was thirty-four years of age, and had just made a name for himself as an architect, when the great fire of London in 1666 cleared the field for him. One of his earliest works completed after the fire was Temple Bar, erected in 1672, and removed two centuries later (in 1878), in which we had an excellent example of his style, and of his judicious use of ornament. In connection with his ecclesiastical work it must be remembered that Wren was called upon to build large churches hurriedly, and at a very small cost. His church designs were hampered by various considerations, and invariably by lack of funds, but he succeeded, almost without exception, in obtaining good effect in a simple and inexpensive manner.

Before the old Gothic cathedral of S. Paul was destroyed by fire, Wren, who had been instructed to survey it, had given an adverse report, in which he stated that the columns were giving way under the weight of the heavy roof. He made various recommendations, but the debate upon his report dragged out, in the usual way, for many months, and nothing was really done until the question was finally settled by the great fire and the total destruction of the building. In a striking passage in Evelyn's diary, dated August 27th, 1666—six days before the fire broke out—he states that he, with Wren and several experts, surveyed the structure that day, and concluded that a new building was necessary; " and we had a mind," he says, " to build it with a noble cupola, a form not as yet known in England, but of wonderful grace." Some years passed, however, before the committee could settle whether the ruins should be restored on their old lines, or whether an entirely new design should be erected; and it was not until 1675 that the new cathedral was put in hand.

As with S. Peter's at Rome, Wren's original plan was a Greek cross,



107. BLENHEIM PALACE, OXFORDSHIRE

Sir John Vanbrugh, Architect

108. S. PAUL'S CATHEDRAL, LONDON

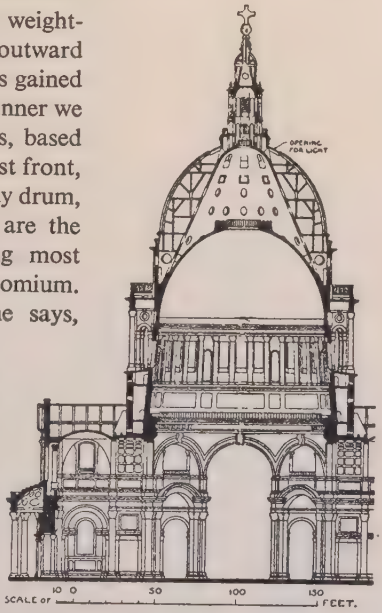
Sir Christopher Wren, Architect

109. REGENCY HOUSES, THE PROMENADE, CHELTENHAM, GLOUCESTERSHIRE

110. CHISWICK HOUSE, MIDDLESEX

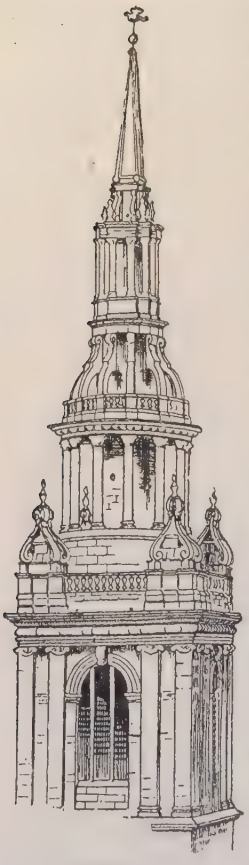
William Kent, Architect

with four equal arms; but the authorities would not agree to this departure from the ecclesiastical form, and it was accordingly extended into a Latin cross. In the exterior design we see two stories of the Corinthian order (108), but the upper tier is not so much an integral part of the church as a screen for the flying buttresses which lie behind it, holding the vaults in place and itself serving as a continuous pinnacle, weighting and driving downwards the outward thrusts. Clerestory lighting, too, is gained behind the screen walls, in the manner we have noted at the Pantheon, Paris, based on the S. Paul's design. The west front, and the dome, resting upon a lofty drum, surrounded by a fine peristyle, are the most successful features, leading most critics to endorse Fergusson's encomium. "The exterior of S. Paul's," he says, "surpasses in beauty of design all the other examples of the same class which have yet been carried out; and, whether seen from a distance or near, it is, externally at least, one of the grandest and most beautiful churches in Europe." S. Paul's has the advantage over S. Peter's in that it was completed within the space of thirty-five years, under the superintendence of one architect. S. Peter's, on the other hand, suffered from various interruptions, and occupied a century and a half in building, while twenty popes and a dozen architects had a hand in its construction.



111. SECTION THROUGH TRANSEPT AND DOME, S. PAUL'S CATHEDRAL, LONDON

The illustration (111) shows the method by which, in S. Paul's, the dome is built up. The inner cupola is carried up in brickwork almost in the form of a hemisphere, with an opening 20 feet wide at the top. The dome, as we see it from the outside, is constructed on a much more imposing scale, in woodwork covered with lead; a brick cone, built up between these two, carries the heavy stone lantern. The arrangement is in part dictated by structural needs and in part by the purpose to make the dome look as fine a feature outside as in. Owing to the high



112. STEEPLE OF S. MARY-LE-BOW, CHEAPSIDE

elevation and the consequent foreshortened view from below, a hemispherical dome would have looked squat and ugly. This the Italians had found to be the case, and we saw their attempts to make the best of things by adopting a slightly pointed section for both the internal and external shells. Structurally, too, the more pointed the dome and the more vertically downwards will the outward thrusts be driven. Wren is entirely logical in making separate shells in that the one seen from within is relatively low down, where it can secure some buttressing behind the colonnades; and the drum is slightly cone-shaped too, to carry the oblique thrusts further down to the security of the "crossing". His devices do not altogether obviate the need for tying in, but they minimise the strains to be borne by the chains, which, as in Italian domes, encircle the danger point near where the shells conjoin. The outer covering is in timber for lightness' sake, and the timbers are securely tied together so as to evade any risk of their bursting outwards.

The interior of S. Paul's is hardly so impressive as the exterior, but it does not disappoint in quite the way S. Peter's does, for it is on a smaller scale, and one does not expect such great impressions from it. The internal effect of the dome is marred by the excessive relative lengths of the nave and of the choir. At first, on entering, one is hardly conscious of the dome; after approaching it, the great length of the choir detracts from its grandeur.

In Wren's numerous London churches he showed great skill in the use of simple materials, and in making the most of the limited funds at his disposal. In many designs the most successful features were the steeples, which he may claim to have been the first to introduce to English Renaissance architecture. A notable example is the beautiful and finely proportioned steeple of Bow Church, Cheapside (112). But the steeple belongs more truly to Gothic architecture, where it forms

an appropriate crowning feature of the whole design. The emphatic horizontal lines which mark all Classical compositions render the Renaissance steeple, with its diminishing storeys piled one upon the other, somewhat of an anomaly. In S. Brides, London, we have a good example of Wren's method of treating the interior of his churches. In S. James's, Piccadilly, there are galleries over the aisles, an arrangement which Wren only occasionally adopts.

The Sheldonian Theatre at Oxford, the southern portions of Greenwich Hospital, Trinity College library, Cambridge, and the garden front of Hampton Court Palace, are among Sir Christopher Wren's most important secular works. His genius is more evident in such buildings as these than in his London churches. It would be too much to expect of any man that he should be successful in the designs of half a hundred churches, all built at the same time, and from limited funds. It would seem that Wren monopolised the work of the latter half of the seventeenth century, for during this very active period there was hardly a building of any importance which did not come from his hands.

There were, of course, some lesser lights among contemporary architects, and among them we may name two; Captain Wynne, who designed several mansions about London, and who, in one of the last of them, old Buckingham House (1705), made early use of a type of plan later to become popular with eighteenth century architects; and Henry Bell, a competent provincial designer working in and about Kings Lynn, where the delightful little Custom House (1683) pleasantly represents him.

With the eighteenth century new names come into prominence, notably Hawksmoor, Vanbrugh and Gibbs. Hawksmoor worked as assistant to both Wren and Vanbrugh, but also produced buildings on his own account. He gave us the London churches of S. George, Bloomsbury, and S. Mary Woolnoth; Gibbs, the interesting designs of S. Mary-le-Strand and S. Martin-in-the-Fields. The greatest work of Sir John Vanbrugh was the mansion of Blenheim (107)—the nation's gift to the Duke of Marlborough—designed in the ponderous symmetrical style which the architect affected, and which is seen again in Castle Howard, Yorkshire. These three men maintained and broadened the influence of Wren's manner of design. Each was a great man in his own right, though overshadowed by the still greater personality and genius of Wren. Nicolas Hawksmoor's architectural manner is so kindred to Wren's that, at first sight, some of his buildings could readily be mistaken for those of the master. The same applies to

James Gibbs, though less forcibly, for he profited much by his studies in Italy, where Wren had never been, and brought back with him fresh Baroque ideas; though like Wren, he resisted the extravagance of contemporary Italian design, and tamed it to the more sober English taste. It is, indeed, more than a little difficult to appreciate the direct connection between the Italian Baroque and the work of this small group of English architects, so skilfully have they extracted and emphasised the best of its features and rejected the worst. Of the four, Sir John Vanbrugh is the least skilful in disguising his original sources. His contacts with Italy were not direct, for he did not go further afield than France, but his mansions have quite a little of the dramatic grandeur and the pretentious scale so commonly found in Italian works of the time. With Wren, whose long life permitted him to work well into the eighteenth century, these " Anglo-Baroque " architects eliminated the last lingering traces of the Transition almost completely, and securely established the English version of Renaissance architecture over the length and breadth of the land. Wren had shown how to use brick in conjunction with limited quantities of stone, and in the less important domestic buildings, a pleasing type of simple square-built house became almost universal during the first part of the eighteenth century. This " Queen Anne " house has always formed a good model for later generations of architects: it greatly influenced also, the early " Colonial " architecture of the United States.

Meanwhile, other architects were giving a new turn to developments, reflecting a trend also notable in France remarked in the previous Chapter. Important among these was a group of protégés of Lord Burlington, great patron of the arts; Kent, Campbell and Leoni, the latter a Venetian. These turned again to the stern Classical precepts of Palladio, and rejected the flamboyance of the Baroque. Exteriors were severely formal and restrained. The whole-heartedness with which Palladianism was accepted is illustrated by the fact that no less than four near-copies were made of one of Palladio's own works, the Villa Capra, near Vicenza, which had been built by him for Monsignor Paolo Almerigo. The first of these reproductions was that at Mereworth Castle (1723) in Kent, by Colin Campbell, and despite the unsuitability of the plan arrangements, which include a windowless central hall, to a climate so vastly different from that for which they originally had been designed, the building seems somehow to settle itself pleasantly to the English scene. More suitable is the version of William Kent, erected at Chiswick (1729) outside London, since it was

113. THE HORSE GUARDS, WHITEHALL, LONDON

William Kent, Architect

114. OLD NEWGATE PRISON, LONDON: IN THE 18TH CENTURY
George Dance, Architect
From the drawing by Thomas Malton, 1792

115. FONTHILL ABBEY, WILTSHIRE: VIEW OF THE WEST AND NORTH FRONTS
James Wyatt, Architect

built not as a residence but for a storehouse for the works of art collected by Lord Burlington (110).

Kent (1684–1748) is indeed the outstanding figure among the " Palladians ". In his early youth apprenticed to a coach painter, he ran away and by devious means reached Rome, and there and at Venice studied architecture and painting for several years. It was in Rome that he met Lord Burlington, a man of great possessions whose passion for the arts led him to encourage and support with his commissions the men of exceptional talent he encountered. Kent had very varied abilities, and turned his hand to craftwork in interior decoration, including furniture and painting, and to book illustration as well as to architecture. He was, too, a pioneer of free and picturesque manner of landscape gardening, for which England was soon to become famous and much emulated abroad. Best known amongst his buildings is the Horse Guards in Whitehall, London (1742) very representative of his masculine and essentially English style (113). It is Palladian in essence, and scrupulously correct in its Classical detail, yet original in massing and the disposition of forms. It is quiet and restrained, and the clever use of rusticated effects gives it strength and repose. Among his domestic works, Holkham Hall (1734) is the biggest, with a symmetrical plan, disposed into one large central and four smaller outlying pavilion blocks. Elevationally, it is not uniformly attractive as the wings conflict in scale with the central block; internally, the rich and stately decorations, especially of the columned Great Hall, are typical of his style and period, for despite the relative austerity of the exteriors of these buildings of the Palladian architectural group, and the somewhat tiresome play of variations on the same formula, incorporating the almost inevitable columned portico, interior decoration was by no means so restrained. In fact, Baroque usages, in the Italian sense, are there much more prevalent; the greater proportion of eighteenth century major architecture is a kind of Palladian-Baroque compromise, a formal severity outdoors and a lavish profusion within. In the first half of the century, Italian interior decorators were often employed, and they were given a fairly free hand in deciding upon the character of the detail, but as the century advanced the architects themselves took over an ever greater control of the design, even to the furniture itself, leaving the craftsmen, imported or native, a very much narrower field.

Kent's work undoubtedly is sometimes heavy, even ponderous, but others of his circle had a lighter touch; whilst later generations of

" Palladians ", profiting by the movement towards antiquarianism of which we shall speak presently, brought interior decoration to a fine pitch of delicacy and refinement.

Beyond the Burlington group of architects were others of note with similar Palladian tastes; Flitcroft, Ripley, Vardy, Isaac Ware, and Geo. Dance, senior. By them and others in their turn, current Georgian practices were spread in ever-widening circles over the country as a whole; town, village and countryside alike. We use the term " Georgian " rather than Palladian advisedly here, because despite differences of viewpoint as to the objectives in the use of the Classical manner, there was but the one main kind of architecture, which all knew and all admired. The unity of the arts was as complete in the eighteenth century as it had ever been in Gothic times. The Renaissance was the national style, and the Baroque and Palladian versions of it were but overlapping stages in its growth, to be succeeded by others bringing it to age and eventual decay. Herein, we can but select particular instances to illustrate character and trend, but we should give a false picture if we did not stress the universality of the Georgian style and call to mind the countless hosts of smaller, unpretentious buildings which associate themselves so gracefully to give distinctive charm to the older parts of our villages and towns.

Sometimes now, whole parts of towns, and villages too, were designed entire, in terraces, formal squares, quadrants and circuses. Among the earliest of such ventures undertaken was the scheme comprising the Circus and the Royal Crescent at Bath, extending between about 1728–75, the work of the two John Woods of Bath, father and son. The elder of the two was the designer also of a very fine mansion nearby; Prior Park, Bath, (1735–43) in the grounds of which is an ornamental bridge based directly on a design by Palladio, an academic exercise precisely repeating one already carried out by Robert Morris, an architect who has no other distinction, at Witton Park, Wiltshire. John Carr of York (1723–1807) was another notability who carried out comprehensive civic schemes; at that town and at Buxton (Crescent), and had besides a very extensive and lucrative provincial practice, working almost entirely in the north of England. Even more prolific were Sir Robert Taylor (1714–88) and James Paine (1716–89), the latter an extremely competent architect and one of the most able house planners of the eighteenth century.

In such wise was Palladianism spread afield; but with waning vigour, for further changes of ideal were taking place meanwhile. Geo. Dance

the younger (1741–1825) and Sir William Chambers (1726–96) were the last two important personages adhering to the Palladian principles in this country. Dance was academically minded and studied with such diligence that he had little time to produce original work, his chief claim to fame resting on an aptly grim monument in London, the old Newgate Prison (1770–82), now destroyed (114). Nothing more forbidding or suggestive of " life without hope " could have been conceived. The façades were austere in the extreme, and crushingly massive rusticated dwarfed the narrow and forbidding portals, ornamented with festoons of sculptured fetters. Chambers was a more versatile genius and had a colourful personality and history. First intending to follow in his father's footsteps as merchant, he voyaged to the East Indies and to China, where he studied Chinese buildings and gardens. His studies seem to have turned his interest towards the architectural art. On his return to England he published books on " Designs for Chinese Buildings " and a " Dissertation on Oriental Gardening "—which were not without influence on contemporary practice or his own later work—afterwards studying in Paris, and for some years in Italy. In England his first works were at Kew Gardens, where his Eastern experiences led him to produce some architectural oddities in the shape of imitation pagodas; he did besides, some ornamental garden " temples " and an attractive orangery in the classical taste. Chambers designed many such garden buildings in his earlier career; for in the later eighteenth century no nobleman's park was considered complete without one. The gem among buildings of this class is his Casino at Marino, near Dublin, so meticulously and expensively finished within and without that it cost, it is said, no less than £60,000. It is a tiny building, yet contains a number of miniature rooms, ornamented with most refined delicacy. In large scale architecture his great triumph was Somerset House, in London, commenced in 1776. This magnificent building fronts the Thames, and is one of the chief glories of the metropolis still to-day (104).

Many of the architects earlier mentioned, and others too, wrote books explaining the proper parts and proportions of architecture, based on the works of Palladio and other Italian authors, or gave advisory designs for parts or the whole of buildings; and these, together with the translations of the original Italian books, had great effect in spreading the Renaissance method abroad and making it possible for even the most modest craftsmen of the remoter regions to work with, at worst, a reasonable competence and assurance in the now universal style.

Such " pattern books " were responsible for the ready emergence of the Georgian character in colonial buildings in America.

Books also played a large part in spreading the taste for antiquarianism which became so prevalent in the later part of the century. We have seen in previous sections that the discoveries at Herculaneum and Pompeii first turned attention back beyond the Italian Renaissance to the sources which inspired it, and this archaeological interest expanded and grew apace. England at first reflected this new interest at second hand, but soon its own enquirers were making their own personal investigations upon the ancient Roman and Greek sites. Robert Wood published books on the ruined Roman cities of Palmyra and Baalbek in 1764, and the appearance of " Antiquities of Athens ", a meticulous measured record of surviving Greek buildings, produced by James Stuart and Nicholas Revett in 1762, created an immediate stir, though its full effects in intensifying revivalism were not to be felt until later. Sir William Chambers' books on Chinese buildings and gardens, referred to above, are other evidence of the rising romantic craze for novelty in architectural design and decoration.

The first to introduce the antiquarian note into buildings were the brothers Adam. Afterwards, Palladianism commenced to wane. The Adams came of an architectural family. There were four sons of an architect father—himself having a considerable reputation in his time—but only two of the sons achieved real fame, Robert and James, who almost always worked in association. Some few buildings may be attributed to James alone, but it was Robert who was the originator, or, at all events, it is he who usually is allowed to represent the pair. Robert (1728–92) and James travelled abroad between 1754–7 and visited France, Rome and Venice. They saw Palladio's work at Vicenza, and James, in his diary, expressed a poor opinion of it. Later, they spent five weeks measuring the ruins of the Emperor Diocletian's palace of retirement on the Dalmatian coast of the Adriatic, and their book, " Diocletian's Palace at Spalatro " later was published, in 1764. It was not this particular study, however, which gave the Adams' work its special character; it is evident that they had been inspired more by ancient work in Rome itself and particularly by Roman stucco decorations in the great baths buildings and tombs; for their fame rests more on their extraordinary facility in interior design and decoration than on architecture proper, and even the latter owed what it had of novelty to the delicate turn given to the decorative embellishments, and the light and graceful proportion of the orders and architectural elements (116).

" Country Life " Photograph

116. HOME HOUSE, 20 PORTMAN SQUARE, LONDON

Robert Adam, Architect

117. CUMBERLAND TERRACE, REGENT'S PARK, LONDON

John Nash, Architect

Robert Adam, his brother working with him in most instances, acquired an enormous practice; he almost monopolised the commissions in the later eighteenth century, especially for private houses, much as James Paine and Sir Robert Taylor had done about mid-century. One of the earliest and most attractive of his designs was that for the Admiralty screen and gateway in Whitehall, London, (1760); among mansions, Syon House, Isleworth (1761–2); Osterley Park, Middlesex; and Kedleston Hall, Derbyshire (1761–5), may be taken as representative of the large total he carried out, not to speak of the innumerable works of addition, alteration and decoration from his hand. There are too, certain public buildings by him; the Record Office and some University buildings at Edinburgh, unfinished at his death; and Drury Lane Theatre, London. Boodle's Club, also in London, though by another architect, is often attributed to him as it is very typical of his style. The Adelphi terrace and neighbouring streets of houses was a speculative enterprise on which he embarked and nearly incurred disaster.

Adam believed himself to be an originator, both in matter of planning and interior design, and had no scruple in advertising this belief. His claim was that he diversified planning, presumably by the introduction of elliptical and oval rooms into the hitherto customary range of rectangular and circular apartments, and by systematically varying shapes from one room to another to afford contrast of effect. His theme in interior decoration, so he believed, was based on Roman models, interpreted in Greek spirit. Also, he had an " Etruscan " manner of design in which he took an especial pride. There was less, however, of originality in his methods than he believed. Enjoying so extensive a patronage, Adam soon had a large following among fellow architects, practising a similar if less distinguished style.

Exteriors of the time are relatively plain, Stone is used throughout in the greater buildings; in the less, brick, or stucco-covered brick often serves for all the shell of building apart from decorative embellishments. Stucco, a term given to a specially hard kind of plaster for outdoor use, became an increasingly popular and economical medium for exterior design. The influence of the Herculaneum and Pompeian discoveries manifests itself particularly in the lightening of the proportions of the orders, which became spare and elongated, with shallow entablatures, and in the corresponding delicacy of the mouldings and ornament. The warm, mellow tints of brickwork, contrasted with cream-white " stonework ", gives charm to many a façade of the

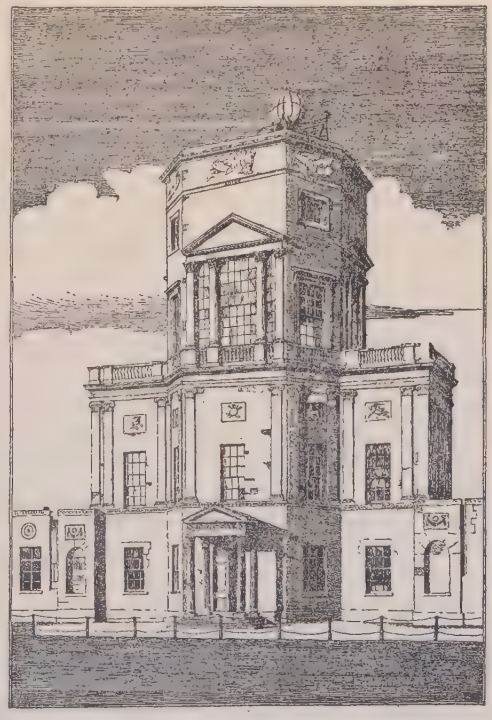
period. Near-Greek profiles to mouldings appear, and ornament often has a similarly late-Greek cast. The " Palladian " type of window, fitted within a semi-circular headed panel, embellished with a shell-like ornament in cream stucco, is a feature frequently appearing, especially in Adam's own work. In town houses, façades often are simple to the point of baldness, but there remains a grace in the proportion which lends that air of elegance which is the keynote of the style.

In London are thousands of brick houses of the type, neatly ranged in almost uniform terraces. Of relief from the prevalent severity, there is little but the slender window frames and sash bars, and usually, a stucco slip outlining their reveals; also, a simple string-mould or two and a note of delicate ornament in the balconies of the principal upper floors. The doorways afford the one higher note of interest, with delicate patterns woven in the glazing-bars of their fanlights and enframed in a columned or pilastered surround. Interiors, notably in the greater buildings, are far more lavish, and sometimes involved fantastic costs.

An important and yet puzzling figure is James Wyatt, (1746–1813) who, at his best, was a brilliant designer and keen rival of Adam in his own field. Like him, Wyatt came of an architectural family. He studied for several years in Venice and Rome, and on his return swept into a fashionable and very extensive practice instantly, in consequence of the high popularity of his designs for the " Pantheon " in London, built in 1770–2 to serve as an assembly hall for concerts, masquerades and other entertainment of the élite of the day. Wyatt's designs are commonly more homogeneous, without and within, than those of Adam. He was a master of Classic form and designed as faultlessly in furniture and furnishings as in decoration. An early domestic work was Heaton Hall (1772), at no great distance from Manchester, very typical of his manner in all respects. Heaveningham Hall, Suffolk, (1788–99), is rather more elaborate internally, but has similar characteristics. All his Classical work evidences a thorough knowledge of ancient precedents and he shows a fine discrimination in adapting them to the public taste which Adam meanwhile had fostered. The orders are almost invariably of elongated proportions, whether outside or indoors, and there is a strong tincture of late-Greek practice in his usages. The delicacy and refinement of his best interiors surpasses the Adam techniques. He is better too, in the mass composition of buildings than Adam, and more original; the Radcliffe Observatory,

at Oxford (118), makes a very fine pyramidal grouping, terminating in an octagonal tower, based on the first century B.C. Greek "Tower of the Winds" at Athens.

Wyatt's reputation has suffered to an unmerited extent because of his unfortunate ventures in "restoring" or modifying certain cathedrals; Lichfield, Salisbury, Hereford and Durham. By these he earned himself the title of "The Destroyer", though the very fact that he was invited by the ecclesiastics to "improve" the cathedrals indicates that the old Gothic work was not then commonly held in the veneration it is to-day. Undoubtedly he occasioned much damage to the ancient work, but more by bad management of his business affairs than by intent. He was overworked and left too much to others, with too little direction, and they sometimes showed an almost shocking unconcern. Much precious glass and many old monuments and decorative works were ruthlessly destroyed, to the end usually, of creating a grand vista down the length of the church.



118. RADCLIFFE OBSERVATORY, OXFORD
James Wyatt, Architect

Wyatt was an erratic genius whose dilatory and unbusiness-like methods often got him into trouble, but he was nevertheless an exceedingly clever man. He is of note in another respect; for good or ill, it was he who consolidated the Gothic revival, a movement which

was to assume high importance in the next century. Gothic architecture never wholly died in England; several of the great masters of the English Classical style, including Wren, worked occasionally in the Gothic vein, but theirs represented a belated aftermath rather than a new trend. With Horace Walpole, writer, who conceived the idea of dressing up his Strawberry Hill residence in Gothic fripperies, the style was born anew, at first as little more than a plaything of the fashionable world. From mid-century onwards, Gothic trivialities were increasingly often used to embellish country mansions, but Wyatt was the first among notable architects to design large dwellings entirely in the new, pseudo-Gothic style. His three major works in this style are Lee Priory, Kent, built between 1782–90, Fonthill Abbey, Wilts, 1795–1807 and Ashridge Castle, Herts, 1803–13. The second of these, Fonthill Abbey (115), was a remarkable, if ramshackle structure, for in key with the extravagantly romantic spirit of the day it was built at vast expenditure and with absurd haste with no more serious object than to serve as a " grand decoration " to the landscape surrounding Fonthill House, the residence proper, and as a place of relaxation " sufficient for the enjoyment of a day whether of sunshine or shower ". This monument to folly had an aspiring octagonal tower, 278 feet high, which having collapsed one day during the process of erection, collapsed again and finally, less than twenty years after completion. Meantime the owner, Lord William Beckford, sold the building, with most of the contents, for £350,000, a good bargain for him since the cost of the work had been £273,000 and the contents proved to be worth some £44,000 at a subsequent auction.

In designing Fonthill, Wyatt, despite his negligent part in its construction, amply succeeded in attaining the desired object, for it was undoubtedly a magnificent decoration and as romantic a pile as any human could have hoped to realise. Ashridge Castle was of different kind, for it was intended as a residence and was more soberly conceived and soundly constructed. In it Wyatt shows his brilliance in composing masses and designing harmonious and pleasantly interesting effects, despite his resort in some degree to the insincerities of the " gingerbread " decorative practices of some of his less gifted contemporaries now practising the revived style.

Romanticism was sapping the vitality of the Renaissance. Wyatt and his work, his superficial brilliance and lack of fibre, are indicative of the contemporary trend. In the later eighteenth century and beyond, much work of solid merit continued to be done in the country at large,

but at the fountain-head, artificiality ruled and true artistic virtue declined. Imitation supplanted inspiration. As we have seen, antiquarianism was gaining an ever firmer hold; sources of reference steadily were becoming more diffuse and men looked back not only to the Renaissance, to Palladianism or the Baroque, but also to the Roman and Greek, to Gothic, to Chinese, and even to Egyptian and Hindoo. Architects, though still practising the Classic as their chief skill, could turn their hand to other styles on demand, and the demand was increasing. In garden design the formal style of the early century, with its broad stately avenues and lay-outs and its geometrical effects, had been succeeded by the landscape school, initiated by Kent, of which the principal exponent in mid-century was Lancelot Brown, nicknamed " Capability " because of his invariable comment that all sites entrusted to him had great capabilities. It was to embellish these landscape gardens, in which nature was cajoled or dragooned into picturesque " natural " compositions, that vast sums of money were expended to erect the grottos, imitation temples, false ruins and the sham edifices such as that commissioned by Beckford, many of which serve as " follies " to perpetuate the shallow vanities of those spacious days. Nevertheless, it is in large measure to eighteenth century garden art that we owe the rich pattern of our countryside to-day.

The long professional life of Wyatt carries us into the " Regency ", the final Georgian phase. Surviving him, and working in the same antiquarian strain as obtained in Wyatt's Classical work was Sir John Soane, an architect of considerable powers, who designed the Bank of England (1795–1827) in its original form, and several great houses of which one, his own former home, now is in use as the Soane Museum. His work maintains the qualities of the later eighteenth century style.

More representative of the declining graces of the arts is that of John Nash (1752–1835), elegant still, but less refined and varied, and faced mostly in that unpretentious material, stucco, a material typical of the phase (117). Like the Adams, Nash made speculative ventures. He produced a great body of work, mainly in London, where he was responsible for some very finely planned streets, lined with terraced stucco-fronted houses, organised into formal, comprehensive façades. Among these, the original Regent Street frontages, now destroyed, with a colonnaded quadrant at the Piccadilly end, were the most famous. He designed besides, the palatial house blocks around Portland Place and many adjacent to Regent's Park. Nash, Decimus Burton, George Basevi and other fashionable architects popularised the new stucco

style. It spread from the re-modelled western parts of London to the developing outer fringe of the metropolis in general, and readily too, to inland and marine resorts frequented by the élite; Cheltenham, Brighton, Bath, Weymouth, Leamington; to give instances. From them again, the stream widened, and almost every town in the land and the country beyond, has its examples of the Regency style. In the larger centres, formal terraces not infrequently occur, as at Newcastle, where John Dobson re-planned the centre of the city (1824–34); more often the houses of the well-to-do now were built as independent " villas ", standing in their own modest grounds (109). The style was severe but effective; the simple cream façades, capped by wide-eaved or parapeted roofs lent an admirable background to the ironwork of balconies or arbours, or contrasted with the delicate patterns in the fanlights of the doors. Bow fronted bays were typical, and the glazing bars of the windows were spider-fine.

Yet in individual buildings of the higher importance, artistic objectives were becoming ever more confused. Nash was not alone a Classicist, for at the Pavilion at Brighton he completed the building in the " Hindoo " style (1817), the interior bedecked with furnishings which showed a remarkably catholicity of taste. Already Henry Holland, who died in 1806, had constructed Carlton House, externally strictly Classical, but inside, varied from room to room in imitation of the Gothic, phases of the Classical antique, Hindoo or Chinese. At Windsor, Jeffrey Wyatt, nephew of James Wyatt, dubbed Sir Jeffrey Wyatville on the occasion of the approval of his plans in 1824, remodelled Windsor in terms of the periods represented by the building in his day; Norman, Gothic and Renaissance. In such wise was the stage set for the " Battle of the Styles " fought through the greater part of the nineteenth century. By 1830, almost every known historical style was serving as inspiration or model for contemporary architecture. Garden art likewise grew debased, shrank in scale and descended to that petty and patchy aftermath of the landscape school known sometimes as the " specimen tree " phase. Judged in their own vein, good buildings in plenty were still to be seen, for towns were developing apace, but the overriding coherence was almost utterly lost and streets became a crazy medley of heterogeneous styles.

CHAPTER IX

THE NINETEENTH CENTURY

DURING the nineteenth century, architecture by no means matched the enormous progress which was made in all branches of science. Rapid industrial development, great economic changes and a consequent readjustment of the social order, not to speak of the swift expansion of population, created intense and complex practical problems that diverted men's minds from the graces of life and out-moded the eighteenth century aristocratic culture. England particularly, for centuries agricultural, in a few decades became predominantly industrial. Centres of population shifted and the labouring masses congregated in new or rapidly expanding towns, located thickly in those parts of the country rich in coal and iron or in other ways well suited to the prosecution of industrial processes. Great belts of hastily constructed, close-packed mean dwellings, locked in a tangle of belching factories, encircled many former sedate country towns and villages. The newly-rich industrial magnates lived on the open outer fringe, and drove back and to in their horse-drawn vehicles, or, in the later century, made the greater part of the journey by train, as the large towns grew larger still. Those who had the choice no longer lived in the squalid industrialised parts. Wealth from trade brought a new and influential middle-class to imitate and vie with the nobility who hitherto had guided the country's affairs. Only in those parts of the country remote from the great arteries of commerce—the canals, the improved, hard surfaced roads, and the railways—did the old order in any important degree survive. Small wonder it is that architecture, faithfully reflecting, as always, the pattern of its times, presents a confused picture, against a drab and sordid background.

Britain, leader in the industrial field, has the dubious honour of initiating whatsoever architectural movements of importance there were to take place in the century. England was, in fact, already in the forefront in the later eighteenth and had affected the fashions abroad, particularly as regards her romantic style of garden art.

The Regency, last phase of the Georgian style and of the English

Renaissance and overlapping by two or three decades the turn of the century, was an essentially domestic style; in public buildings the antiquarian mood became increasingly marked and settled into a determined revivalism of ancient styles. The first among these to achieve widespread popularity was the " Greek Revival ", or what its interpreters understood by the term, for their versions usually incorporated variously strong Roman and Renaissance ingredients too; they found the simplicity and stern angularity of the Greek style too inflexible for their needs. The Greeks had not commonly used the arch, but it had become almost indispensable to the relatively complex nineteenth-century buildings. Yet at one point and in certain buildings a very close approximation to Greek practices was attained. Decimus Burton's Gateway (1828) at Hyde Park Corner, London, is one of the purer instances of Greek revivalism, and another is H. W. Inwood's S. Pancras Church (1819–22), which more or less faithfully reproduces the Erechtheum at Athens, caryatid porch and all—used in duplicate for vestries on the north and south sides—crowned with a steeple closely resembling in its main part the Tower of the Winds at that same ancient city (119). Other principal examples of the phase, assembled in less-recognisably Greek style, and more aptly described as Graeco-Roman in their origins, are University College (1828) and the National Gallery (1832–8), both by William Wilkins; and the British Museum (1823–47) by Sir Robert Smirke, pupil of Sir John Soane. Despite their brorowed dress, these buildings are very fine. Outside London are H. L. Elmes' S. George's Hall (1815–47) Liverpool, perhaps the most splendid building of the whole Greek revival; and the Fitzwilliam Museum, (1845), Cambridge, by Basevi. In the " thirties " of the century, Sir Charles Barry gave revived Classicism a new turn by abandoning the columnar style in favour of the " astylar " treatment in his designs for the Travellers' Club (1830) and the Reform Club (1837), based on Florentine and Roman Renaissance palaces rather than the antique. Professor C. R. Cockerell may be said to be the last of the " Graeco-Romans ". His Bank of England buildings at Manchester and Bristol (1844), Liverpool (1845), and the Taylor Institution at Oxford in the latter year, have a truly Roman robustness combined with a Grecian quality of detail. In the " forties " of the century, the earliest English phases of the Renaissance as well as the Italian came to be imitated, and architects looked back, too, to the " Tudor " and immature " Elizabethan " styles. Thus revivalism turned upon itself, and reproduced its own beginnings.

119. THE WEST FRONT, S. PANCRAS CHURCH, LONDON

H. W. Inwood, Architect

From the drawing by Thomas Shepherd, 1827

120. THE HOUSES OF PARLIAMENT, LONDON

Sir Charles Barry, Architect, with A. W. N. Pugin

Throughout the century the " Battle of the Styles ", Classic and Gothic, was fully joined, the honours passing first to the one and then to the other. Miscellaneous minor revivals allied themselves with each. The revival of Classic architecture, whether Greek, Graeco-Roman or Renaissance, was by no means exhausted by mid-century, but it is a reasonable generalisation to say that it then lost place for a while to the mediaeval as the dominant practice. After 1880, Classicism returned again to the higher favour in most kinds of building except the ecclesiastic, and still preponderates to-day. The late nineteenth century Classic is a hearty vigorous type, suggestive of the high Baroque, but in some ways original and generally less exact in reproduction of historical forms than had been the case in the earlier part of the century. " Free-Classic " is the term sometimes used to describe it.

We now must re-trace our steps to pick up the threads of the Gothic Revival where we left them dangling in the previous chapter. As we shall see, the movement was not by any means limited to this country, but flourished on the Continent and in America as well, but nowhere with the same heartiness and to the same extent as in England.

After James Wyatt's initial endeavours in the latter part of the previous century, in this—the nineteenth—most leading architects could turn their hand to either manner, Classic or Gothic, as required. William Wilkins, the skilful architect responsible for the Classic British Museum and other celebrated buildings, also designed works at the Trinity and King's Colleges in Cambridge in the Gothic style; John Shaw produced a fine version of the famous " Boston Stump "—the slender " Perpendicular " octagonal tower in the town of that name—in his church of S. Dunstan in the West (1831), Fleet Street, London. More important in giving high authority and sanction to the revived style was Sir Charles Barry, in consequence of his unique scheme for the Houses of Parliament, built between 1840-60. The commission for the work was won in a formal competition against other architects, in 1836, in which Barry was said to have submitted " a Grecian design overlaid with Gothic ornament ". The Grecian element, if ever there was any, appears subsequently to have been eliminated, for none is to be observed in the world-renowned buildings as they have emerged (120). The outward effect, at all events, is Gothic—vaguely " Tudor " and very like the exterior of Henry VII's Chapel at Westminster Abbey, the façades powdered with fine decoration. Yet the building is unmistakably nineteenth century, especially

as regards its plan arrangements; apart from churches, buildings of the times nearly always were planned on formal, Classic lines, whatever might be the character of the outer dress. In the design of the minor accessories and fitments, Barry was assisted by A. W. N. Pugin (1812–52), a fanatical mediaevalist architect who designed very many churches and religious buildings in this country and in the colonies. Pugin was a crusader for the Gothic style who believed and preached in his writings that men should seek to recover the spirit and fervour of the Middle Ages, so that their work might again be truly Christian. He, together with Ruskin, brought the Gothic Revival into full flood. John Ruskin (1819–1900) was a writer rather than architect, but his teachings had the more effect for that. Revolted by the sordid and chaotic aspect of towns, he sought to restore a universal appreciation of beauty. His great eloquence commanded respect, and his principal books " Seven Lamps of Architecture " (1849) and " Stones of Venice " (1851) had great importance in his own time and since. He deplored and scorned the current fickle and superficial antiquarian taste. " A day never passes without our hearing our English architects called upon to be original, and to invent a new style. We want no new style of architecture, we want some style," he says in the first-named of the above books, and goes on to advocate that architects in general should agree on one style and school themselves so exhaustively in it before venturing on designs of their own that they would unconsciously progress from it on a common basis. . . ." and thus it might come to pass that a new style should arise." Unfortunately, he offered alternative suggestions for the universal basic style—the Pisan Romanesque, and the Tuscan and Venetian Gothic styles of Italy, together with " the English earliest decorated "—and, so far from persuading architects to unity, called their attention to further antiquarian minor sources not so far exploited. Hence confusion became the worse confounded. From then on, the British mediaevalists were quite undiscriminating in their choice from among the historical styles and were less and less concerned to observe antiquarian purity in their practice. Selection was personal and individual and ranged the whole gamut of the English as well as the Italian styles, with admixtures and innovations too, in plenty.

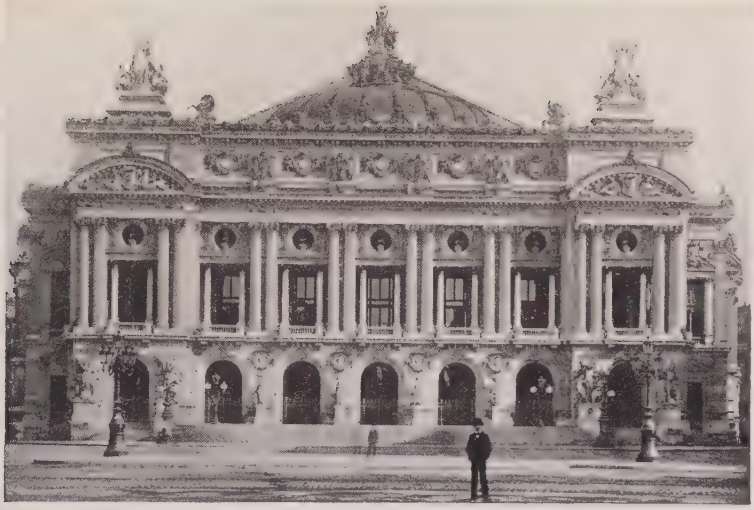
A significant figure of the second half of the century was Sir Gilbert Scott, leader in the architectural field when the Gothic movement was at its height. He had an immense practice, which included the " restoration " of many old mediaeval churches; for at that time, there was a

firm belief that the revived style was a clear improvement upon the old. "Modernisation", sometimes involving extensive re-building, was responsible for the loss to posterity of much old work, especially of interior fitments. Scott's superlative design was that for the ornate Albert Memorial (1862–72), London, nowadays the butt for much misdirected ridicule, so "curiously wrought" and so abundant in the variety of its rich materials and forms that it might stand for a monument to the Revival itself. Scott was responsible too, for the design of S. Pancras station, an uninspiring and worried-looking building which is none the less an equally fair representative of the new Gothic as then applied to commercial buildings. At one time he showed some leaning towards Byzantine revivalism also, but it was left to J. F. Bentley to produce the most worthy of all designs in that style—the Roman Catholic Westminster Cathedral (1895–1903), London.

The Gothic, almost universal for religious buildings throughout the century, spread increasingly to the secular in the second half. Many are the Gothic town halls, warehouses, factories, market halls, etc., in the manufacturing towns. Country houses, and their suburban counterpart, the "villas", and scholastic, commercial and industrial buildings, more and more often affected this latter-day Gothic style Between one and another, buildings had little in common except a profusion of small, over-decorated parts, a serried sky-line and a confused general pattern; of neighbourliness there was little or none; and what with the similarly wide variations now open to the followers of the Classic school on the other hand, and the litter of impedimenta on and about the streets now considered necessary adjuncts to the comfort and convenience of civilised man, the industrialised towns lost almost all vestige of coherence, order and pleasantness to the eye.

In the second quarter of the century, the railways had developed apace, and by the sixties had formed a country-wide network supplementing and in part supplanting the functions of the canals and the roads, made serviceable for industrial traffic in the latter part of the eighteenth century. Whereas bulk transport formerly had been difficult, and the carriage of building materials therefore costly and laborious, these highly improved communications transformed the situation entirely, and the products of widely distributed industries could be brought together with relative ease at almost any place in the land. The regional character even of minor architecture consequently almost entirely disappeared, except in a few sheltered backwaters; and further,

the production of building materials could be undertaken on an extensive commercial scale. Glass could be made in fine large sheets, and leaded panes or wooden sash bars no longer were really necessary; bricks and tiles of differing grades and colours and of consistent quality could be turned out in bulk; iron was being produced in abundance; terra-cotta could be cast in vast quantities and impressed with patterns with the greatest ease. The carver-craftsman's day was gone; the machine had supplanted him. Ornament could be used in profusion cheaply, and men took delight in this seeming extravagance. Buildings acquired a hard, metallic and highly artificial air, not merely because of the harshness of the materials employed but also because they were put together with a similar precision and exactitude. Stones were finely surfaced; bricks and tiles, hard and shiny, laid with hair-fine joints. Materials of differing colours were used in the one building—initially, under the Italianate impulse given by Ruskin, for polychrome buildings were common enough there—often in such harsh contrasts that, unlike the Italian examples, they clashed with and confused the essential architectural lines. As to larger buildings, William Butterfield was among the first to employ polychrome schemes. Keble College, Oxford (1870), by him, is a notorious instance of what has been irreverently termed the " Streaky Bacon " style (122). Smaller buildings, houses especially, preserved something of their severe, Regency elegance well into the century, but near to and in the towns, the use of coloured bricks and other products of the mechanical age was common enough by the " sixties ". Decadence then proceeded apace, and the suburban fringes, then the almost exclusive nesting-place of the moderately well-to-do, were larded with villas in the Gothic taste, profuse with steep gables, bays, porches and—new feature—metal and glass " conservatory " excrescences; not to speak of half-timbering, coloured bricks and tiles and " ornaments " in terra-cotta. Gardens in general accompanied architecture in its decline, cut up by serpentine paths into a patchwork of dank shrubberies, variegated tree clumps and irregular lawns, broken here and there with flower-beds ablaze, in season, with violently contrasted red, yellow and blue blooms of " bedding-out " plants disposed in too-orderly array. Indoors, profusion was the key-note too; rooms crowded with miscellaneous furniture, heavy and dark, ornamented beyond comprehension; a little gilt and much red plush, knick-knacks galore, souvenirs and curiosities from the homeland and from mysterious places overseas, and a palm, an aspidistra or a fern or two to cool the overheated eye.



121. THE OPERA HOUSE, PARIS

Charles Garnier, Architect

122. KEBLE COLLEGE, OXFORD: THE CHAPEL

William Butterfield, Architect

123. CHURCH AT LONGMEADOW, MASSACHUSETTS

But the architecture of the day has many faces and not all of them are unpleasant or unkind. England's material prosperity, her vigour, her pioneering, questing spirit are reflected in them all; and as we are still to see, the whole of her nineteenth century story is not yet told.

EUROPE. Glancing for a brief while at developments on the Continent: we have noted already, in the previous chapter, that Italy and France shared with England in the antiquarian movement of the later eighteenth century. In Italy, the Greek Revival phase is reached much about the same time as in this country. The main entrance gateway (1835) to the gardens of the Villa Borghese, Rome, by Canina, is one among many quite worthy instances of the style. In the main, however, Italy is architecturally unimportant throughout the century and need not detain us in this brief review. The country continued predominantly agricultural, and consequently there was not a great deal of building activity occasioned by industrial development. In such building as there was, the Classic tradition survived to serve, for the most part, in one form or another. The Gothic revival, apart from the inevitable occasional exceptions, was repudiated much as the full-bodied original Gothic had itself been refused.

In France, close imitations of the Classic Greek were few and mostly unimportant, but of Graeco-Roman exteriors there were many in addition to such as the Madeleine Church and the Arc de Triomphe, already named in the previous chapter. Practice in the Classical vein passed more easily than in Germany or England to a free interpretation of the Renaissance, a strong and characterful version not unlike the Baroque but in which national traits are retained and developed. Instances are—the Library of S. Geneviève (1843–50), by Labrouste, a building devoid of columns of which the exterior powerfully expresses its purpose of use; and the Opera House (1861–74), both at Paris. The latter, by Charles Garnier, especially is representative of French artistic skill in using the age-old architectural elements in an original and refreshing manner (121). It is sumptuously ornate, inside and out, as befits its character; gay, yet dignified at the same time. It is a masterpiece by any standards, and a most able piece of planning and design. Only a little less distinguished are the two palaces of the Arts, the Grand Palais, with its near neighbour, the Petit Palais (1897–1900); the last by Girault, a cleverly planned and graciously inviting building. That the national skill in the decorative use of rusticated effects had not declined there is the Musée Galliera to show, this built about 1890. All these latter buildings are in Paris.

The Gothic Revival took little hold in France and is almost as unimportant there as in Italy. Germany found it more congenial, and adopted it with more enthusiasm, especially for public and the greater domestic buildings, side by side with Classical practices. As to the latter country, French influence was once more paramount over the greater part of the land, except as regards the Greek revival, the first of importance in the nineteenth century phases as it was in England. Germany was, in fact, very early in the field in reviving the Greek. The Brandenburg Gate, at Berlin (1789), is an instance. This building was modelled on the Propylaea at Athens, though, as usual in revivalist interpretations the columns were made distinctly more slender than in the original. The Ruhmeshalle, of similarly austere Greek Doric style, is one of several notable buildings, all at Munich, designed by the architect Klenze (1784–1864). A celebrated contemporary of Klenze was Schinkel (1781–1841), designer of the Museum (1824–8) and other works in Berlin. As elsewhere, even when architects definitely set themselves the task of reproduction, Greek precedent was by no means strictly followed, as its limitations proved unequal to adaptation to the many new types of social and public building now in demand. Practice soon lapsed from the sterner objective into the Graeco-Roman and thence, as in England and France, back to the Renaissance again. These were not clear-cut changes; they overlapped very considerably. Hence the Houses of Parliament at Vienna, though built as late as 1883, are more Greek than Roman in inspiration, whilst the Houses of Parliament at Berlin, very little later in date, have the florid, coarse, " Free-Classic " character much more typical at the time in Western Europe as a whole.

America. At this point we must hark back some little way to pick up the threads in the New World, for though the earlier architecture of North America has no importance in affecting the progress of architectural history, during the nineteenth century America began to play her creative part in current affairs, instead of being dependent on Western Europe—mainly England and France—as had been the case previously.

The " Colonial " period of American architecture is usually taken to extend from about 1630, when the older states were in process of foundation or consolidation, to 1800; but of the " Early " Colonial phase, up to 1700, when memory of the form of building in the parent countries was the chief guide, very little trace now survives. These initial efforts were crude, humble and plain; in the eighteenth century—

the " Georgian " phase of the Colonial style—the colonists became much more adept, and their buildings, though still simple, almost severe, in design, were fully worthy to compare with the work being done at home. In most of the new states, developments taking place in England were closely followed, though at a little distance of time, for the current fashions had first to find their way afield. Wren or " Queen Anne " influences were paramount up to and beyond the mid-century, evidenced in a robust and vigorous architecture, still bearing unmistakable traces of the Italian Baroque which originally had inspired the style. Now, however, in the eighteenth century, American craftsmen no longer had to rely on memory alone, for the home trends were much more safely transmitted through the " pattern books " being published in England in abundant variety. Besides the books by the original Italian authors which had long been available, there were others more fitted to the interpretation of the humble though aspiring American carpenter-craftsmen, written by such as Campbell, Gibbs, Ware, Chambers and Adam. Of still simpler kind were those by Langley, Morris and Paine. Among these books could be found decorative guidance for almost every architectural occasion, domestic or ecclesiastical; for public buildings were as yet few. By the time the full effect of the pattern books was felt, Georgian architecture at home and in America had traversed towards that charming, graceful and light version of the Renaissance known as Rococo—or, alternatively in England, " Adam "—and this was especially suited to the principal material available to the colonists, wood; though brick too was quite extensively used in some localities. It is this later eighteenth century work in America which has come to be regarded as typical " Colonial " —spare and simple usually, ornament being concentrated around the doorways or at other special points—but every whit as refined and tasteful as contemporary work overseas (123). In the South, the slender-columned portico, spanning the two floors of the height, was a favourite feature. Throughout this time, architecture remained anonymous; the architect as such had not appeared, and it is the homely carpenter or housewright who created the Colonial style. Samuel McIntyre (1751–1810) was one such, a man of exceptional talents who worked almost exclusively at Salem, Massachusetts.

The drift towards antiquarianism was reflected in America too, though transmitted as much by direct contacts as by the copy book. Having won her independence (Revolution, 1775–83), the United States felt an increased need for Governmental and administrative buildings,

and under the influence of the Classic revival in England and France, some notable work in the style was undertaken, including the Capitol and the White House in Washington, the Mint in Philadelphia (1799–1801) and the old Custom House in New York.

The most extraordinary figure of this " Post Colonial " Period, as it is called (about 1790–1820), was Thomas Jefferson (1743–1826), for two terms President of the United States, democrat, author of the Declaration of Independence and man of scholarship besides. He had lived for five years at Versailles, in the service of his country, and had travelled extensively in western Europe. Architecture was one of his several interests, into the study of which he delved with characteristic thoroughness. From France he drew inspiration from the ancient Roman temple of the Maison Carrée at Nimes for the Capitol building at Richmond, Virginia (since remodelled), and he designed and superintended the building of his own home, Monticello, (1796–1809) in the Classic style, where he spent the residue of his life. These works, and a group of stone-trimmed, brick buildings at the University of Virginia, which owes its foundation to him, confirmed the antiquarian trend in America; but the launching of the Greek Revival proper, which took great hold in the country from about 1810 until the sixties, (Civil War, 1861–5) was due to English-born Benjamin H. Latrobe (1764–1820), an architect of distinction responsible for many fine works, these at times clearly derived from European Classic masterpieces, Greek or Renaissance. The Parthenon and the Monument of Lysicrates served his occasions, and the Pantheon at Paris was the model for his Baltimore Cathedral (1806–18). Latrobe's Bank of Pennsylvania, in Philadelphia, was the first building in the Greek Revival style (1799).

The Greek Revival was followed with intense fervour throughout the firmly settled parts of America, and for fifty years or so became almost the national style. Ancient precedent was not followed scrupulously, but was adapted in a free and fresh way to suit American occasions and materials. The spirit of the Greek originals was, however, admirably caught, and there was generally much less admixture of Roman and Renaissance elements in the American buildings than in those of the so-called Greek Revival in Britain and European countries. Many towns owe their initial dignity and spaciousness to the building works of the period.

Although paramount, the Greek Revival was not the exclusive practice in the earlier nineteenth century. B. H. Latrobe, its first important American patron, also was probably the earliest to introduce,

in a comprehensive way, the revival of Gothic architecture there; for he prepared an alternative design for Baltimore Cathedral in this style. It was not used, his Classic version being preferred; but he made other Gothic designs later for churches which were actually built. The Gothic Revival steadily increased in favour thereafter, especially in ecclesiastical circles. Richard M. Upjohn (1802–78) was another Gothic designer early in the field. Trinity Church, New York (1839–46) was his most famous work. In general, however, the Classic held sway until the descent of both, Classic and Gothic alike, into the meanness and confusion of the sixties and seventies of the century, this much about the time that English architecture too reached its lowest ebb.

But in America, there next followed (after 1875) the Romanesque Revival, the first movement of national importance founded in that young country and without important parallel abroad. It was launched by the endeavours of H. H. Richardson (1838–86), a man of considerable talent and great tenacity of purpose. The movement was widely accepted and extensively followed until towards the end of the century, but not, by any means, to the exclusion of the Gothic and Classic, which continued to be practised in parallel.

As a whole then, American architecture was markedly eclectic from about 1860 on, up to and beyond the first world war, drawing inspiration from all the main European sources and from a wide variety of historical periods. Yet due to the work of Richardson and a few other notables, the quality and taste of the work produced rose to new heights; and besides, vastly important developments were taking place in the planning and structural arrangement of buildings and in materials and methods which were to turn architecture in a new direction, in America as in Europe, as we shall see later on. Meanwhile we here note finally the very representative and superbly finished work of a very famous firm, McKim, Mead and White, work which carries on over the end of the century into the next. The most distinguished member of this firm was C. F. McKim (1847–1909). It produced a great body of work, mainly Renaissance in type, but including Roman, Romanesque, Byzantine and Gothic too, some recognisably based on historical precedents but so fresh and polished in style and so admirably adapted to the circumstances of the New World that they appear as distinctively American. The masterpiece is a small but rich jewel of a building, the library of the millionaire J. Pierpont Morgan, built in New York in 1906 in the Italian Renaissance style.

The Rise of Industrial Architecture

Superficially, architecture at home and abroad was declining, but behind the scenes and in unobtrusive ways, new resources, the inevitable accompaniment of the industrial age, were accumulating. Scientific progress could not but have its effects upon constructive methods in building or fail to produce new materials or old materials in new forms. A truly colossal amount of building work was done during the century, much of it upon classes of structure unlike any which had been in use before. Indeed, ways of life had changed so much that there was scarcely any type, if not completely new, that was not radically different from its preceding historical form. Industry and commerce, of course, made quite unprecedented demands, but also, civic administration expanded and called for greater, more elaborate and more numerous buildings; universal education required thousands of schools; indoor recreation developed; nonconformist sects needed their own kinds of places of worship; even dwellings took on a new character, built mainly for town and suburb instead of for country use. Thus architecture, although outwardly chaotic, inwardly was undergoing transmutation and adjusting itself to the times. There were so many and varied practical problems to be solved that it is not surprising that the *art* of architecture suffered a set-back meanwhile.

Much of the skill of the day went to the solving of the practical problems, and some among the keenest minds were concentrating entirely on finding constructive solutions, putting aside for a while considerations of artistic effect. Especially was this the case in railway construction, which was so completely novel and difficult that the great engineer-architects scarcely gave a thought to appearances—though they often achieved fine architecture nevertheless. The railways provided an excellent experimental field for the working out of new methods, with new materials; especially cast and wrought iron, steel and, scarcely less important, glass. Tunnels, viaducts, bridges, retaining earth-works of all descriptions, warehouses, sheds, engine-houses, goods and passenger stations were demanded, these last with wide-spanning roofs to cover the railway tracks without obstruction. At first, the older ways of building with stone and brick had to serve, but with these alone the railway engineers worked wonders of skill, sometimes surpassing the finest achievements of Ancient Rome. The great new departure, however, was structural iron, which could be produced in enormous quantities once coke instead of charcoal had come to be used as a fuel, and certain improvements of manufacture had taken

place. First cast and forged iron and lastly, after mid-century, steel, became abundantly available to constructors. Increasingly, structural iron supplanted the older materials. Famous architect-engineers like Thomas Telford (1757–1834), I. K. Brunel (1806–1859) and Robert Stephenson (1803–59) used it extensively, whether for road or rail bridges. A remarkably early venture (1779) was that by T. F. Pritchard, a great wonder in its day, a bridge spanning one hundred feet over the Severn at Coalbrookdale. R. Burdon surpassed this with " a handsome iron bridge " of 237 feet span, rising one hundred feet over the river Wear at Sunderland, in County Durham, completed in 1796 and opened in the presence of a " vast multitude of spectators ". How much of an intrusion into the calm, leisurely eighteenth-century scene these innovations must have represented may be imagined from the admiring comment made by one of the onlookers—" Vessels of 200 to 300 tons burden can pass under with only striking their top-gallant masts."

Telford, earliest and perhaps the greatest of these architect-engineers designed the Conway Suspension Bridge (1822–6) and, a vaster work, the Menai iron-chain Suspension Bridge (1819–26) to carry the Holyhead Road. The latter is 1,000 feet long in all, and 580 feet in its greatest span. He had projected, as early as 1801, a wonderful bow-shaped bridge, leaping 600 feet in a single arc, to replace the old London Bridge. This design was not used. Brunel's best known work is the spidery and spectacular Suspension Bridge at Clifton, Bristol, designed by him before 1831 but not completed until 1864, with variations from his scheme. Stephenson built the railway " Tubular " bridge at Conway (1846–8), cleverly camouflaged to match the ancient castle which it adjoins; and in 1850, the double (road under rail) High Level Bridge at Newcastle-on-Tyne, and the Britannia Tubular Bridge, over the Menai Strait—the latter a construction 1,840 feet long, 460 feet in each of the two central bays (1846-50).

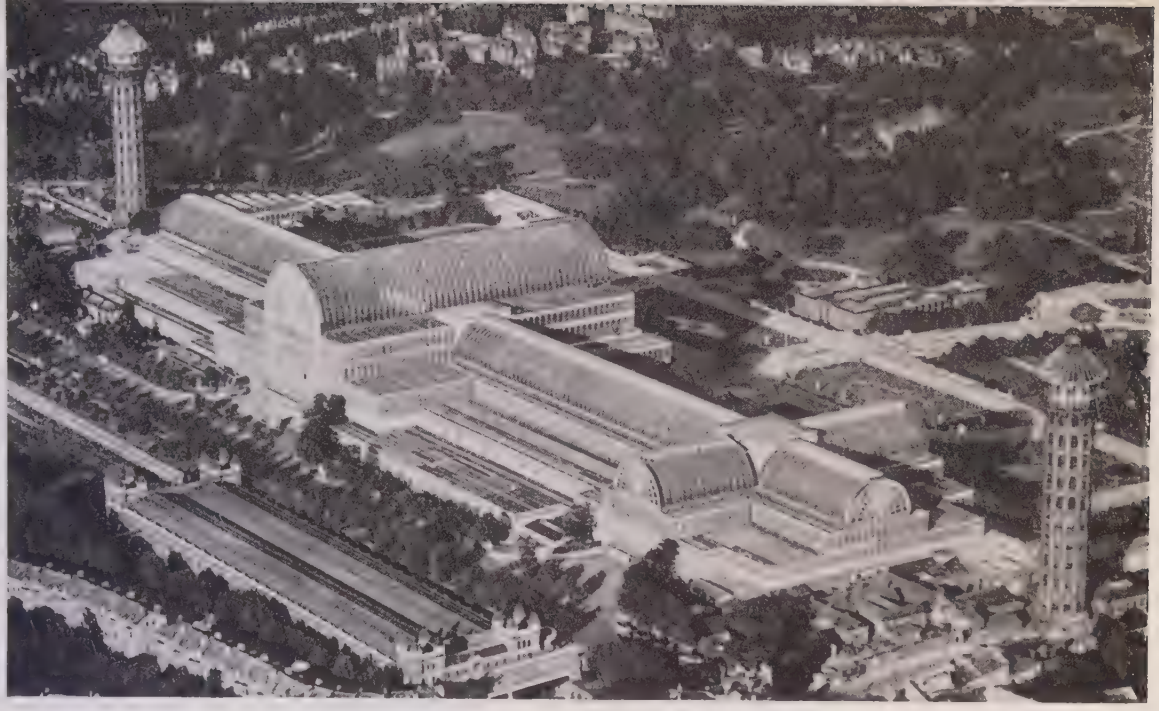
Such constructions were all the more remarkable in view of the limitations of the principal materials employed, for although cast-iron will support very great weights, it is brittle and unreliable when submitted to other kinds of stress; hence wrought-iron, which is tougher against tearing action, was substituted where necessary; prior to the bulk production of steel (1856) which has balanced capacities and can serve for either purpose. Not all metal structures were so sightly, as well as effective, as some among those named above; many were far from beautiful.

Iron came to be used extensively too in structures of a more orthodox kind. Cast-iron pillar supports and beams were found invaluable for carrying the tiers of floors of thousands of mill buildings, in Lancashire and Yorkshire particularly, allowing great expanses of almost unobstructed floor space in which to operate machines, a freedom which the older materials would not have permitted. Thus began the " framed " structures of modern times, in which entire buildings are carried upon a box-like lattice of uprights and beams, the floors and walls being merely panels supported upon them. The " sky-scrapers " of America, of which we shall speak later, are dependent upon this form of construction and could never otherwise have reached their towering heights. But we are looking too far ahead.

Mr Joseph Paxton summed up constructional progress up to his time in designing a remarkable hall—or series of halls:—of cast-iron and glass to house the great exhibition of 1851; the Crystal Palace, as it was named (124). Paxton was a gardener turned engineer-architect, whose brilliant idea, adopted after an abortive competition in which 245 designs were submitted, undoubtedly derived from his knowledge of green-house design, which the building closely resembled despite its gargantuan dimensions. Thackeray thus extolled it:

" A blazing arch of lucid glass
leaps like a fountain from the grass
to meet the sun."

Paxton succeeded where his architect competitors failed, for whilst almost all of them produced ponderous stylar schemes which were unsuited to the brief occasion and could not even have been built in the time available, he spanned great spaces economically, in a manner which allowed rapid construction, with a light, airy and cheerful structure made up largely of standardised parts. It created a great stir in its time and could be recorded as the first true example of " modern " architecture—for it answers all the proper tests—were it not for the fact that it had no abiding influence on architecture; it was in advance of its time. It has, however, its important place in the great train of engineering experiments made throughout the century which proceeded in almost complete independence of " polite " architecture, concerned as it was with following current fashions in dress; until, in the next, the two streams converged. Yet the Crystal Palace was a significant landmark and foreshadowed that classless, international, social kind of architecture which is developing so strongly in our own time and which to-day we call " modern " for want of a better term. The Palace,



124. THE CRYSTAL PALACE AS RE-ERECTED AT SYDENHAM, LONDON

Sir Joseph Paxton, Architect

125. HEADQUARTERS BUILDING OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS, LONDON

126. THE GLASGOW SCHOOL OF ART

first erected in Hyde Park, was afterwards removed to Sydenham where it was almost completely destroyed by fire in 1936.

Great engineering constructions of similar " hall " type became increasingly common thereafter, in this country and in France and America. The three countries kept fairly equal pace in developing the metal and glass vault, as well as in bridge design. Other (continental) countries contributed too. Station halls, covered arcades, exhibition buildings—both temporary and permanent—and market halls were erected in growing numbers and at ever more dizzying spans. One of the largest *domical* vaults of the century, at an international exhibition held in Vienna in 1873, designed by an English engineer, had a span of 350 feet; but much more grand was the metal-roofed " Halle des Machines ", part of the Paris Exhibition of 1889, covering a rectangular hall 1,400 feet long by 385 feet wide, built on a four-centred, pointed-arch system. Among bridges, Brooklyn (1872–83) America, was the largest of the suspension type before 1900, spanning 1,595 feet; and that over the Forth (1883–90) the greatest instance of the " cantilever " type, this being 1,710 feet in each of the main bays and achieving a total length of 8,295 feet. These dimensions have been surpassed since; by the bridges over the Hudson (span 3,400 feet) and Sydney Harbour.

The gulf which in the nineteenth century lies between structural engineering and architecture was nowhere so apparent as in station design. Over the tracks and platforms were unpretentious, frank structures of iron and glass (timber and glass in the early century), " decorated " sometimes with a trace of period ornament, but frequently impressive because of their dimensions and the efficient and economical way in which they fulfilled their everyday tasks of sheltering the multifarious human activities arising out of transport and travel. Before them in the greater towns, stood the shielding façades, sophisticated pieces of fashionable architecture conceived in quite independent vein. In the rear parts utility was supreme; the architectural qualities were incidental and not the outcome of deliberate design for effect. The façade blocks were masks, public buildings of a much superior social caste, a recognised field for architectural display. Euston (1846–8) and S. Pancras (1866–70) London, are cases in point, the one attired in Neo-Grec dress and the other in Neo-Gothic. The architects both were distinguished men of their day. Philip Hardwick designed the indisputably impressive Doric gateway and stately Great Hall of Euston; Sir Gilbert Scott the much less reputable, fussy S. Pancras,

with its many tiers of over-decorated windows, as much criticised in his own time as since, and which, it has been said, represents a re-used façade design originally intended for the Foreign Office, but sternly rejected by the Foreign Minister, Lord Palmerston, who would have nothing to do with " this Gothic style ". The working rear parts of Euston have no special qualities, but those of S. Pancras are compact, grand and spectacular. The single-span, pointed-arched glass vault over the tracks is the largest in the country, 243 feet across; and beneath the station proper there are two further stages, the one a floor of cellars designed to warehouse Burton beers, the unit spacing between the pillar supports reputably being " the barrel of beer "; and below again, are the Metropolitan lines for the local trains. Despite some attempts to draw the station sheds and their front buildings into artistic unity by applying corresponding ornament to the former, there is no real harmony between the two main parts in the majority of instances. There were exceptions; King's Cross station, which *was* designed as a whole, by an engineer-architect, Lewis Cubitt, in 1852 has more real quality than most largely because it is relatively unpretentious. Emmet, a nineteenth century architect and devastating critic of his fashionable fellows, summed up its virtues in the comment—" It is not graceful, but it is simple, characteristic and true, and no one could mistake its nature or use ".

As has been indicated, continental and American engineers kept close pace with England in technological developments. Among distinguished Frenchmen was Gustave Eiffel (1832–1923), famous for the tapering open work metal tower, 1,000 feet high, which bears his name, erected for the International Exhibition at Paris in 1889. He has several notable bridges to his credit, too. The advances in the use of structural metal in the more ordinary kinds of building were unobtrusive at first. As we have seen, the cast iron pillars and floor beams such as had been used from the beginning of the century in English mills and factories eventually suggested the use of a complete metal frame, the frame itself carrying the outside walls and so reducing enormously the amount of masonry necessary, in the case especially of multi-floored buildings where the lower walls otherwise would require to be ponderously thick to carry the accumulated weight. In certain of the major cities of America, such as New York and Chicago, building space became tremendously valuable, and even before the introduction of the metal frame, very tall buildings were being used. The saving which the frame there represented was immediately obvious,

and once the efficacy of the method had been illustrated, it was seized upon avidly by Americans and developed apace. Yet the first appearance of the metal frame in an important building was in France, in Labrouste's Library of S. Geneviève (1843–50), referred to earlier, though there, the load-bearing function of the frame has not been realised and it terminates in a metal and glass roof, cased within the walls. The full conception of the modern idea was afterwards realised in the Home Insurance Company Building (1883–5), Chicago. The invention of the electric lift about the same time (1880) opened the way fully to the achievement of soaring heights in the skyscrapers which are now the marvel of many American cities.

The unusual proportions of these tower-like buildings made the incongruity of period decoration still more plainly apparent. Many odd experiments were tried to fit this unprecedented kind of up-ended architecture with stylar dress, some of them most ingenious and a few not altogether unsuccessful. Gothic and Classic precedents however, required to be queerly contorted to meet these historically unique conditions, and no really progressive solution was arrived at during the century, though at once there were men of exceptional abilities forthcoming who applied themselves to the problem. Three Americans were especially notable in this regard; H. H. Richardson, mentioned in the previous section, and J. W. Root, both of them stalwarts of the Romanesque Revival. Also, there was Louis Sullivan. Their aim was to review architecture afresh in the light of the abundant technological developments so far made. They did much to free architecture of its period mannerisms and prepare the way for later advances in the direction of modern architectural practice.

The steel frame was quite widely used for all classes of urban building by the end of the century, and particularly for commercial structures. Metal even began to play a decorative part in the external façades; there are shop-stores in France and Germany of the nineties in which it is used in this way. The structural steel beams and supports came to be made with an I shaped section, as it was found that this shape realised the optimum strength of the metal with the least waste. Moreover, the quality of the steel so improved that its capacities could be very precisely calculated, and thus no more than was strictly necessary for safety required to be used. Yet steel has its own defects, and quite apart from the problems arising from its novelty as a vital building material, there was corrosion to fear, movement in expansion and contraction due to temperature changes to overcome and, above all,

the danger of fire to combat—for the high heat of a conflagration would reduce the whole framework to complete ruin. In these latter matters, the traditional masonry construction has the advantage. Thus it has remained the practice to case steel in a protective covering of concrete or masonry in the construction of multi-floored buildings.

It was not until near the end of the century that reinforced concrete became an important competitor with steel for use in framed buildings, but the vital experiments had, of course, gone before. In single storey buildings, where the fire risk is negligible and the protective covering unnecessary, steel is the more practicable and economical of the two; but for tiered buildings reinforced concrete usually is better than the protected steel frame, for it is, in effect, a re-created stone, laced with thin rods of metal scientifically disposed to meet whatever kinds of stress are to be anticipated in any given member of the frame. Since the metal is the absolute minimum necessary for the structural purpose, it is thus commonly able to do similar kinds of work at less bulk, and therefore, less weight, than masonry-cased steel. This advantage, however, does not apply if the spaces to be bridged are large, for the reinforced concrete then becomes heavy and bulky unless perhaps, it is turned into arch or shell-vault forms, these not practicable on successive floors. In both cases it is the metal which does the effective structural work. The artificial-stone part of the reinforced concrete is a compound of fragments of stone or brick of varying sizes, together with fine gravel or sand, all well mixed together and made to adhere with the aid of cement, the latter operating when water is added. The Romans, we saw, used concrete too, but not concrete combined with metal. Also, they customarily built all their walls stone by stone, by hand, using the cement-and-sand elements as a mortar. Modern concrete is mixed beforehand and, whilst wet, is dumped into position and tamped around the net-work of reinforcing metal bars which is set up, in advance, inside a wooden " formwork " which casts the finished concrete into the required shape. The temporary formwork—of wood or metal—is removed after the concrete has set. Reinforced concrete construction, it will be seen, is a highly advanced technical process, and the preparation of a building design a complicated scientific matter calling for a lengthy and careful training. At the outset, when the material was first used, processes were not quite so advanced as has been described, but they soon became so.

The basic scientific enquiries leading to the reinforced concrete

technique were made by German engineers, but it was French architects who took up the tale of experiment and initiated the first building ventures. The earliest building wholly in concrete was a church in Paris, S. Jean de Montmartre, begun in 1894. French designers have maintained their lead ever since.

The Beginnings of Modern Architecture

Although the general character of architecture in England in the latter half of the century already has been referred to, little has been said so far about certain new trends which originated in this country, of high importance in moulding the form of western architecture in general in the twentieth century. One of these was in the realm of Housing and Town Planning.

Eighteenth century methods of town development had lapsed in the chaos of industrialism, and dismayed by the appalling conditions in which millions of toilers were living, a few enlightened individuals laboured to improve matters. Charitable trusts were formed, which concerned themselves at first with the erection of hygienic, if grim and forbidding blocks of tenements, though as the movement expanded, separate houses too, were built. Other inspired pioneers had more comprehensive schemes; Robert Owen, James Silk Buckingham and Sir Titus Salt conceived and developed ideas of constructing entire, more-or-less self-sufficient small village or town-settlements, in which home, place of work and means of relaxation were to be pleasantly disposed in "green" surroundings. Owen's was a comparatively simple scheme for small communities, devised in 1816 for the rural re-settlement of the unemployed after the Napoleonic wars; Buckingham's ideal town of "Victoria" was most thoroughly worked out; but both came to naught and remained as unaccepted ideas. Salt's version of "Saltaire", on the other hand, was actually realised in physical shape, (commenced 1852) though in very modest form and as little more than a village related to a single factory in Yorkshire (now one of the suburbs of Bradford). Much more extensive, yet of the same kind as Saltaire initially, were Bournville (after 1888), related to Cadburys', and Port Sunlight (after 1895) to Levers' industrial undertakings. A most important writer, Ebenezer Howard, combined and developed these conceptions in his book "Garden Cities of Tomorrow" (1898) a work which had and still has a very wide influence. Letchworth (begun 1904), a balanced town of 32,000 inhabitants, resulted, and Welwyn, a second garden city venture, followed later on.

These and similar, less striking, experiments and writings spread afield, at home and abroad, not only a cleaner, saner mode of planning but also a new, social, conception of architecture and its environment—for, when the purpose and place of buildings has been foreseen in carefully designed relation to the needs of the people and to the pattern of a town as a whole, it becomes difficult to fall into that typical error of the nineteenth century, which was to elaborate buildings as individual and isolated works of art. Thus these developments in Town Planning —which, of course, from the visual standpoint is nothing more than architecture on a broad scale—led towards the development and realisation of present day ideals; as we shall see.

The later nineteenth century architecture, then, is by no means so retrograde as it might seem on a casual survey. Behind the elaborate, indescribably varied, occasionally brilliant but more often absurdly pretentious façades, inner arrangements were unobtrusively being accommodated to the vastly changed needs of a new, teeming, industrialised world; new materials of all kinds and new combinations of materials were being tried out, and their true and correct uses discovered; daring experiments of an unprecedented kind were being made in purely industrialised works in road, railway, mill and factory design; towns as a whole were beginning to be designed and arranged in an orderly, pleasant pattern. Lastly, even in the matter of architectural effect, significant changes were taking place, though these may easily escape unobserved because of the vast profusion of buildings erected during this period of tremendous industrial expansion, dressed in the motley of the imitative styles.

Origins of new trends always are deep-seated and difficult to trace. The germ of that kind of architecture which we to-day know as "Modern"—though some day it will acquire a distinctive name—lay well back in the nineteenth century, and all those developments referred to in the last paragraph were manifestations, apparently independent one of the other, of its growth and increasing momentum. There were other evidences too; social, literary and artistic; and polite architecture itself latterly began to show unmistakable signs. By 1900, the character of the new architecture was almost, though not quite, fully formed. England was its birthplace, but it matured and first flowered abroad.

Ruskin, the influential writer of the mid-century, we saw, was deeply dissatisfied with the architecture of his day. Its increasingly indiscriminate historical borrowings disgusted him, but his remedy, if

indeed he clearly visualised one, led nowhere. " Select one style and stick to it until it takes national roots " was more or less his prescription. Unfortunately, as we have seen, he gave alternative historical styles as suitable, phases of the English or Italian mediaeval, and those that harkened selected among them at will and so intensified the very chaos against which he preached. Yet his ardent teaching was not altogether vain. William Morris (1834–96) had the same profound dissatisfaction; and took action. He believed the machine to be responsible for the low ebb in art and advocated and practised the revival of craftsmanship. Like Ruskin, he was a mediaevalist at heart and looked back to the days of the mediaeval craft guilds. He and his work initiated what is known as the " Arts and Crafts " movement, which may be said to have been launched in 1861. He occasioned a vast if at first circumscribed improvement in craftwork design; but more directly important to architecture was the fact that he commissioned his friend, Philip Webb, to build for him his own house, The Red House (1859), in the design of which his own ideas were admirably expressed. Summed up, they amount to a rejection of imitative period ornament and instead, require the free and frank expression of the house as a dwelling and of the natural properties of the materials of construction. Morris did not actually abhor ornament, but sought to make it rational and harmonious with the nature of the materials used. The Red House is, indeed, somewhat romantically mediaeval and irregular in arrangement, but compared to other houses of its day, is severe.

Architecture in general went its riotous or pompous way undisturbed, until the tale was again taken up in the work of R. Norman Shaw (1831–1912) a man whose influence was wide in the architectural profession. He designed very many domestic buildings. At first, about the eighties, he followed the revival of the Gothic and Elizabethan styles and popularised these; but already there was a distinctive contemporary character in his work, a greater directness and simplicity than had been usual so far. Later, he turned towards a revivification of the homely expressiveness of the " Queen Anne " period, though without slavish imitation. Indeed, the elements he uses appear so natural an outcome of the materials and arrangement of his buildings that they are almost styleless, and in this respect, especially, anticipate the " Modern " architecture of our own times. The unpretentious, intimate and charming, sometimes cottage-like air of so many of our English dwellings in use to-day is due largely to Shaw and the several able architects who followed his lead.

Much more nearly still to the progressive architecture of to-day came the work of C. F. Annesley Voysey (1857–1941), in some instances a remarkable anticipation of it. Before the end of the century, Voysey was designing dwellings in which the reference to distant historical precedent was negligible, if not completely absent, and which were an admirably direct expression of the intimacies of home life. He designed many houses, so well attuned to the needs of the day that they established the type for thousands. They can to-day be readily passed unnoticed, for their descendants abound in our suburbs, though only rarely attaining the original distinction of style. One characteristic is especially marked; he did not attempt to produce that robust, massive solidity which historical architecture normally had; the walls of his buildings frankly appear as an " envelope ", thinly and comfortably surrounding the living space, and cut through for lavish windows where convenience dictated.

Meanwhile, the Arts and Crafts movement spread afield; and in substantial degree, the architectural developments were a part of it. Morris preached his gospel widely. He himself held to his original views and resented the machine age, but his followers in due course came not only to accept but to welcome the machine; they saw finally that through it art could reach all, instead of the limited few which the handicraft method permitted. This fact recognised, the stage was fully set for the development of modern art and architecture.

So far, the continent had taken little part in the new developments, but the impetus of revivalism everywhere was reaching exhaustion. The more original continental artists became aware of the interesting English developments, and seeing them, were stirred to emulation. So there sprang up there, firstly in Belgium and Austria about 1893, parallel developments based on the English. America also followed suit. The first manifestations abroad were those classed as " Art Nouveau ", a term which stands for an exuberant mode of architecture in which traditional references were consciously set aside in favour of novel forms. Art Nouveau was itself sterile and unprogressive, but it served to clarify ideas and to focus enthusiasm and constructive thought. Out of it grew the Modern movement, for although at first misconceived, the basic idea of re-assessment of art in the light of current needs was right. One Briton in particular stands on the threshold of the modern development in art and architecture; Charles Rennie Mackintosh (1868–1928), architect and artist. His work was not extensive, but important. His principal building was the School

of Art, Glasgow (126), built in two phases, 1897–9 and 1907–9. Internally, the design of the library shows him as a disciple of the new art; it is highly decorative, even ornate, yet with not a historic note anywhere. Externally, vigorous simple effects proceed rationally from the inner arrangements of the building. The work of Mackintosh had considerable importance in spreading the new idea abroad, especially to Germany.

CHAPTER X

THE TWENTIETH CENTURY

THOUGH the year 1900 may be taken as a definite stage in the advance of the Modern movement in architecture, the Battle of the Styles was by no means concluded, and the bulk of building work continued to follow indiscriminately-chosen ancient patterns, as before. Yet this antiquarianism—the conscious copying of the architecture of former times—steadily lost force, reflecting the trend towards the levelling-up of the social classes and the passing, in Britain, of the peak of industrial and commercial prosperity. As the century advanced, there was less of lavish ostentation in the greater buildings on the one hand, and less meanness in the work-a-day structures on the other. The advance of education encouraged the development of a simpler taste. Population in industrial Britain for a while tended to grow quite fast, but the rate of increase progressively declined, and is now very slight. Nevertheless, the need for new building scarcely slackened at any time, for rising standards of living and social advances in general called for the replacement of unsuitable buildings and for a wide variety of new recreational and amenity types. Also, there were serious arrears occasioned by the two great wars, the latter one causing devastating shortages which scarcely yet have commenced to be taken up. Recently, economic stringency has played an important part in encouraging simplicity of architectural effect.

In the design of public and commercial buildings, the free-Classic proved the more favoured vogue, and edged out Gothic revivalism in the countries where the latter had taken root in the previous century; but itself became simpler and plainer as time advanced. In Britain, a contrast of the earlier and the later buildings forming part of the Civic Centre at Cardiff will illustrate the growing moderation of taste; or the City Hall (1906) in this Cardiff group—a splendid latter-day flowering of the Baroque (128)—may be compared with the Norwich Town Hall (1938) or the Royal Institute of British Architects' Headquarters in London (125). Very many fine buildings of traditional complexion were erected; good individually, but so often spoilt as

ornaments to a town by reason of their rubbing shoulders with other buildings, maybe equally good, but of different kinds of revivalist design. Such incongruities are a commonplace still in this century as they were in the last; in all westernised countries and not alone in Britain. In some American cities the incoherence of street architecture is made still more distressing because of the very great disparity in the heights of buildings, where occasionally, outrageous contrasts of size are to be seen; wee, crouching old-fashioned frontages huddled close alongside multi-tiered towers reaching for the skies. In general though, the former vulgarity has waned, and there has been a steady improvement in the average level of design.

In street architecture of the earlier decades, pompous elaborate façades, bedecked with period ornament, were common enough, the superficial falsity of their monumental effects often exposed by their standing upon almost continuous expanses of plate-glass shop windows —even public buildings were liable to be subjected to the indignity of this kind of commercial exploitation—and despite the care taken to disguise them, the now almost invariable steel or concrete frames insistently betrayed their presence in the general outer arrangement. The Classical elements, suspended in space, increasingly were shouldered aside to make way for ever greater window expanse, and in the scanty, tortured surviving fragments, for a while still vainly attempted to simulate the grandeur of former times. Kingsway, London, a new thoroughfare built up about the nineteen-twenties, and Nash's Regent Street, undergoing reconstruction a little later on, afford numerous instances of such absurdities. By the nineteen-thirties, their day, in turn, had passed, and the better urban buildings took on a grave sedate air, expressed in simple lines and broad, bold masses, whilst still retaining a reminiscence of the classical architecture from which they derived. Well-known instances are the Underground Railway offices in Westminster, and the new London University buildings, the latter in course of erection from 1936–9, but as yet incomplete.

In the Commonwealth overseas, a spacious and impressive group of buildings was constructed at New Delhi (completed 1930) this a new Government centre for India, some seven miles outside the walls of the old Delhi. The architect for the greater part was Sir E. Lutyens, the author of a great number of domestic and public buildings in England and the designer of England's chief memorial of the two great wars, the Cenotaph, in Whitehall. Lutyens steadfastly adhered to his own personal version of the Renaissance throughout his professional

life, and was remarkably original in his use of the Classical elements. Latterly, in the years before his death, he had prepared a scheme for a new Roman Catholic Cathedral at Liverpool, an impressive design, again in his usual Classical vein, but fresh and striking in its forms and composition (127). As yet it is hardly commenced. In general though, church architecture in Britain has continued to follow the Gothic manner; and by far the most outstanding monument of the century is that other modern cathedral at Liverpool, commenced in 1903 and still not wholly completed—by Sir G. G. Scott, grandson of the eminent nineteenth century architect of the same name—Gothic in general appearance but Classic in its imposing symmetrical massing.

In Europe, as we shall see, antiquarianism gave place earlier than in England to the modern movement, but one splendid building in the traditional succession needs especial mention; the Town Hall, Stockholm, glory of Sweden, by Prof. R. Ostberg. In the U.S.A., the work of C. F. McKim and his firm already had been referred to, carrying well into the twentieth century; but besides, there were many other notable buildings which it must serve here to instance by the Temple of the Scottish Rite (1915), Washington D.C., a superb piece of academic design by John Russell Pope, showing some similarities to the ancient Greek mausoleum at Halicarnassos, and the Lincoln Memorial (1922) Washington, a solemn monument of impressive grandeur by Henry Bacon (129). In their Classical kind and in suitability of character, it is difficult to conceive that either of these could be surpassed.

Most American skyscrapers, even the most recent ones, though their simple lines appear to deny the fact, belong to the traditional school of architectural design. The initial ventures of the century, such as the Woolworth Building (1913), New York, by Cass Gilbert, were patently classical, the time-honoured elements being manipulated most cleverly to fit the unprecedented circumstances; in later examples, though period ornament is almost entirely shorn away, the massing remains reminiscent of the historical stylar systems. " Height-zoning " regulations, occasioning the setting-back of the building masses at the upper stages, in many cases has so strongly suggested the tapering aspiration of the Gothic style that the designers have been led to accept it as their model or inspiration, though the modern buildings attain soaring heights vastly greater than anything the mediaeval period had known. Vying one with another, these or concrete-framed buildings at length topped 1,000 feet; one of the most recent, the Empire State Building, New York, is 1,250 feet high, with eighty-five storeys providing

for so wide and varied a range of human activities that it comprises almost a small town in itself.

Modern Architecture

A most notable advance has been made in the present century in the realm of Town Planning. The orderly design of towns is not alone a modern art; the Egyptians, the Greeks and the Romans practised it, and there were outstanding achievements in the Renaissance too; yet the problems in the distant historical period were very much simpler than ours of to-day. Then, men lived chiefly by agriculture; industries, such as there were, were of a clean, homely, domestic kind; none of the regular pursuits required the gathering together of great bodies of people. Towns were relatively small, and well distributed. Town Planning then, had usually the object of producing grand ceremonial effects, or of serving the needs of defence; for defensive town walls were laborious and expensive to construct and the most therefore had to be made of the space within them by contriving compact and orderly arrangements of the necessary buildings. In Renaissance times the need for fortifications passed, and planning was almost solely for effect; we saw that in the eighteenth and early nineteenth centuries some stately schemes of civic design were produced in this country, before the chaos of the industrial revolution descended. Abroad, on the Continent, the old ideals of Classic formalism survived longer; in fact, in some countries there—Germany, for instance—there was no complete break in the practice of one kind or other of orderly planning until the devastation of the second great war.

When the art was revived again in England, its immediate purpose had changed. To re-create healthful conditions of living in the industrially fouled towns was the primary aim; not until the present century was legislation importantly concerned also to promote convenient arrangement and pleasant appearance—in that order—and even to-day has some way to go before these latter ends can be positively secured. Most towns still suffer the aftermath of nineteenth century exploitation, but the efforts of the nineteenth century reformers have not been in vain and legal machinery at length exists to redress the defects and to direct future development upon more healthful, pleasant and beautiful lines.

Though legislation has been tardy, by dint of private initiative England has forged ahead in the conception of " garden cities " and complete, balanced towns, in which, we saw, Ebenezer Howard played

so large a part. Commercialism, unfortunately, often has debased his ideals; there are great suburban tracts around the majority of our towns which purport to follow them, but do so with widely varying consistency and success. By and large, however, much good work has been done. The actual development of the two original Garden Cities, Letchworth and Welwyn, of course, falls within the present century and is not yet wholly complete. Hampstead Garden suburb, though partial, is similarly good, and there is the Manchester satellite town of Wythenshawe, of which important parts have been built but much remains still to do. These schemes, and others of their kind have been much admired by foreigners and have had important influence abroad. The names of Barry Parker and Sir Raymond Unwin, architects and designers of many large tracts of modest but delightful dwellings will always be associated with the shaping of Town Planning artistic and social ideals. At the present time, quite a number of fine new towns are projected, more-or-less self-sufficing entities with every provision for work, home and relaxation appropriate to their size.

Beyond Britain, the objectives of town-planning have undergone a similar change of emphasis. In Germany, the conception of the grand, monumental, Classical plan was shattered by Camillo Sitte, who in his book " Town Building " (1889) pointed out the greater suitability of the homely, intimate and human qualities which the informally-arranged mediaeval towns had had. His purpose and message were misunderstood, and a phase of absurd romanticism followed; but it passed in due course and left the way clear for a rational, modern approach to town design. France, Belgium, Holland and Italy similarly by easy stages abandoned the Classical methods for the new; almost all continental western countries, the Scandinavian included, had made great progress in developing town design on modern social lines by the time of the commencement of the second great war, and had launched comprehensive schemes. Italy had built two complete, if small, new towns in connection with a land-reclamation project. In America, land of great spaces, the introduction of ample fine parks into the body of the town is an important modern feature.

To turn now, more narrowly to the progress of architecture of the " Modern " kind.

" Art Nouveau ", we saw in the previous chapter, was a movement on the Continent inspired by the English Arts and Crafts reform. The first flush of enthusiasm carried it to exuberant decorative extremes, but after the initial few years, it grew much more serious and restrained.

In fact, in its architectural terms, it led directly to modern architectural design.

At the outset the movement had been purely superficial, concerned to replace the decorative systems of the period styles by newly conceived kinds of ornament, based on naturalistic forms, but eventually, it became more fundamental, and architecture as well as the arts and crafts were subjected to increasingly exhaustive review. The Continental Art Nouveau, just because of its early extravagances, was immensely valuable in serving to distinguish the true from the false among the principles which Morris and his followers had devised. It came to be seen that any abiding reform must depend upon a complete re-assessment of the utilities from which art and architecture spring and which they are concerned to organise and interpret with visual grace. The realisation grew that these utilities—the function of things and the means and methods by which functions might be performed—had so vastly changed in the industrial era, that in meeting them rationally, there was an entirely new field for art and architecture and a wealth of fresh inspiration. So, progressively, the inapt ornamental forms were discarded, and new, incisive and simple basic shapes emerged; clean vigorous and logical, significant of the advance of constructive science and the machine.

Art Nouveau, then, marks a central stage in the development of the modern movement, an earlier one having been passed in England. Beginning about 1893, Art Nouveau had taken firm hold on architecture as well as the decorative arts by the earliest years of the present century, and had spread to most Western-European countries as well as to the U.S.A., though leaving England for the time being inert. Hence there is to be found much continental work, some American and a little English, evidencing various stages in that final phase of the evolution of modern architecture—the passing of Art Nouveau.

Among continental countries, Germany was much in the lead, and there was quite a small group of distinguished architects there who contributed importantly to the conversion of Art Nouveau into true machine-age style. The work of Mackintosh at Glasgow did quite a little to inspire them. Remarkably advanced in their time were the designs of Olbrich, Endell and Hoffmann. Endell was an early follower of the initial, ornate Art Nouveau style, yet in a writing of his (1898) showed a close appreciation of the shape of things to come. Olbrich too, used the decorative mannerisms of the style and more than a trace of historical fripperies sometimes, yet his buildings in

many particulars show the search for fundamental truth. Hoffmann's Convalescent Home (1904) at Purkersdorf, is appropriately fresh, simple and charming in design and is almost wholly free of ornament of any kind. Peter Behrens is another notable who produced one of the most splendid of the buildings in the present Transitional class; a turbine factory in the Huttenstrasse, (1909) Berlin, embodying a great machine-shop, the function of which is expressed most explicitly externally, largely in steel and glass. Above all one must mention Adolf Loos (1870–1933), an Austrian, the most advanced thinker among them. His earlier works, before 1900, are quite recognisably Art Nouveau, but at the same time show him already to be half-way to the accomplishment of the modern architectural objectives. He is, indeed, probably the first architect to have designed a fully modern building (1910), as we shall see below.

In Belgium, Van de Velde was a notable figure in the earliest days of Art Nouveau, and was instrumental in carrying the initiative from England to the Continent. Holland's pioneer was H. P. Berlage, who set in train the new experiments there. In that country buildings of the Transitional class often are expressed in brick—Holland's prime constructional material. The work of W. M. Dudok, with its broad, sedate, yet pungent effects, is outstandingly representative.

France, which has produced so many men of engineering genius, rapidly developed the reinforced concrete technique. A. G. Perret and Tony Garnier were the first to use concrete as a structural frame to buildings and at the same time frankly to expose the frame externally as part of the elevational design. Previous designers using the technique had disguised the concrete in antiquarian forms. Perret showed his advanced ideas in a Parisian flat block of 1903; but neither he nor Garnier altogether rid themselves of Arts and Crafts mannerisms.

Belatedly, a few near-modern, Transitional buildings came to be built in England. A most notable building verging on the modern vein is the Shakespeare Memorial theatre at Stratford-on-Avon (1932), rebuilt after a fire to the designs of Miss Elizabeth Scott, (who had secured the commission in an international competition) Chesterton and Shepherd. The principal material is brick and though the building is modestly simple and restrained, it contrives to look dignified, charming and rich, fitting admirably into its green, riverside setting.

In the U.S.A. the work of one or two notabilities represents this formative phase, and though they were quite early in the field, the country was behind the Continent in bringing modern architecture to

127. SCHEME FOR THE ROMAN CATHOLIC CATHEDRAL, LIVERPOOL

Sir E. L. Lutyens, Architect

From the drawing by Cyril A. Farey

128. THE CITY HALL, CARDIFF

Lanchester and Rickards, Architects

129. THE LINCOLN MEMORIAL, WASHINGTON

Henry Bacon, Architect

full fruition. Louis Sullivan (1856–1924), was exceptionally fertile in producing new decorative forms. Many of his buildings are quite ornate and bear the stamp of the Arts and Crafts, yet he was a real originator in architectural form too. "Form follows function" was the gospel that he believed and taught—that is, that the appearance of buildings should honestly proceed from their inner use. As early as 1890 he was attempting to prove the truth of it in the work that he did. To his office in 1888 came Frank Lloyd Wright (b. 1869), who took up where Sullivan left off, and by the turn of the century already was producing houses of almost wholly matured character; almost—but not quite. Wright was much in advance of his fellows, and it was sometime later before other American architects reached the same point of emancipation from the traditional styles. Nevertheless, there are numbers of first-rate buildings of Transitional character in the U.S.A., free, or almost free, of reference to historical architecture though having mannerisms of style kindred to the later developments of the European Art Nouveau. One of the finest of such instances is the Nebraska State Capitol, Lincoln, by Bertram S. Goodhue, a grand and great monument, freely ornamented in the architect's own personal style (132).

Modern architecture had just reached maturity in the work of two individuals, prior to the war of 1914. German and Austrian architects again led the way, for there, the abandonment of traditional practices had been far more enthusiastic and widespread than in other countries. Adolf Loos, referred to earlier, working at Vienna and elsewhere, was the undoubted pioneer; his first truly modern building—a house—dates from 1910. Walter Gropius (b. 1883), of Berlin, trod close on his heels. Two factories by the latter, built in 1911 and 1914, show him to have reached the ultimate goal, except that in the later building —a "model" factory built in an exhibition at Cologne—there is still a surviving hint of the Arts and Crafts school; to which original source, by-the-way, both Loos and Gropius confessed their indebtedness.

Some of the principles of modern architectural design will have emerged from what has already been said about the work of individual pioneer architects. The objective of the modernists was to use contemporary resources fittingly to meet contemporary needs—to allow buildings to serve their respective purposes fully and adequately; to allow them frankly to express their character and the nature of their use on the exterior; to use machine processes, machine-made materials and new scientific methods appropriately in solving current building

problems. They wished still to make buildings look pleasant and attractive—a wholly fit and proper endeavour—yet it was upon this particular rock that the ship of the earlier Arts and Crafts or Art Nouveau architects foundered. Though in due course they came, as a body, to recognise the virtues of the machine, and were prepared to concentrate their powers on machine-made art, they found it difficult to conceive that there could be art without ornament; and so, to free themselves of the leading strings of the traditional styles, endeavoured to invent ornament "out of space". The ornament of historical architecture, as we have seen in the earlier parts of this book again and again, was more securely founded, for in the majority of instances it developed naturally from a constructive system, or originated in some meaningful religious symbol or mystical emblem. True modernism began when at last it was appreciated that good appearance—good architecture—could proceed from the surface character of the building materials and the pattern of arrangement of those materials as strictly demanded for the purpose and use of a building. Thus in modern architecture to-day, the designer's task is so to organise his structure and so to select his materials that they provide an efficient, economical, yet also pleasantly attractive building. This is not to say that a really efficient building will necessarily and inevitably look well; such is not the case; usually there are very many ways of arranging a building so that it works effectively and economically, but one among these many alternatives will produce a better appearance than all the rest, and it is such that the able architect seeks. An attractive character is part of the function of a building, and must therefore be secured for full success. Ornament is not denied, but it is considered only to be fit and proper when it supplements (not substitutes) the highest qualities of character the materials and arrangement of a building can be made to produce.

This new architecture is inevitably different from any other that has gone before, for the above principal reasons. Fresh techniques have brought new and alternative ways of enclosure—of carrying roofs and floors and of enclosing space without the use of the historical, ponderous walls. Roofs and floors now can be supported by a few, carefully disposed supports, not necessarily on the line of the outer walls, but within them if need dictates, so that the whole or most of the enclosing sheath need be no more than necessary to meet weather conditions. Window glass can be as much or as little as the purpose of the building requires; panes can be made in great unobstructed sheets or the walling-

bricks can themselves be made of glass. Buildings no longer must be made up of separate box-like rooms, all heavily walled; a light envelope is all that is required, sub-divided by partitions. Modern architecture is logical; it has a proper use for all materials, old-type or new. The present popular belief that modern buildings are inevitably of concrete, and " flat "-roofed, is quite wrong. They may just as well be, on suitable occasions, of long-familiar materials, brick or stone, and have sloping roofs like the old, so long as they meet such principles as here described. Nearly always though, they will be very much more chaste, reserved and simple than those of nineteenth-century taste and their twentieth-century aftermath.

Between the two wars, Modern architecture secured an almost world-wide footing, though preserving, as it doubtless always will, its varying regional character. Germany still retained its lead. Walter Gropius again a pioneer, there established a famous school, the " Bauhaus ", established in Dessau in 1925, where for a decade or so, architecture was taught on new lines as the pivot of all constructive arts. His book " The New Architecture and the Bauhaus ", translated into English in 1935, had a good deal of influence in spreading the new practice afield. The school itself was from Gropius' designs (1926). Other notable architects appeared; Mendelssohn, Mies Van der Rohe, Bruno Taut; whilst Adolf Loos continued his work. In France, the Swiss-born Le Corbusier (b. 1888), appeared as the strongest of advocates of modernism, besides conducting an active and distinguished practice. His views were made widely known by his book " Vers un Architecture ", first published in 1923, translated into German in 1926 and English in 1928. By this he made himself almost the prophet of the modern movement. André Lurçat is another French architect of repute. From among others on the Continent one may mention as representative; J. J. P. Oud (Holland); Alvar Aalto (Finland); Gunnar Asplund (Sweden); and Marcel Breuer (Hungary). In America, R. Neutra and W. Lescaze are well known; Howe and Lescaze have the credit of designing, in 1932, one of the earliest of skyscrapers in thorough-paced modern style, an office building for the Philadelphia Saving Fund Society (130).

In due course England resumed her full part. Having stood aloof from the continental development prior to 1914, there was the Transitional phase yet to pass after the first great war; but at length, buildings in full modern character appeared and multiplied. Foreign architects visited our shores, some of them political exiles, and in building in the

new vein here, repaid the debt which Art Nouveau had owed to this country. Gropius, with Maxwell Fry, designed the Impington Village College, Cambridgeshire; Mendelssohn and Serge Chermeyeff (the latter Russian born) the De La Warr Pavilion at Bexhill (1935).

British Modern architects now are numerous and the tale of modern building is long. British architecture has more than recovered its place. Among many well-known names are Thomas Tait; the firm of Connell, Ward and Lucas; Maxwell Fry; and the " Tecton " (London) Group of architects; these representative too, of the several architects earliest to adopt, in this country, the full-fledged, machine-age manner of design. The latter two firms each are the authors of several characterful buildings; Sun House (Fry) (133) and High Point Flats (Tecton), both in London, are instances.

Here, we have carried the story of architecture up to the time of the second great war. At that point, the case for the new ideals had been made in every western or westernised country and in others besides. As, to begin with, Modern architecture was concerned with re-establishing fundamentals and shedding the hampering and outgrown historical decorative systems, its earliest form was strictly—too strictly—" functional " (one school of thought professed to abhor any hint of confessed decoration whatsoever) and severe in the extreme. Consequently, it found its most suitable and recognisable expression in structures of a utilitarian or homely kind, rather than in public buildings and others of the architecturally " monumental " class. Early instances of Modern architecture thus most often are found among factories, works, shops and offices, bridges, viaducts, hospitals and sanatoria and, particularly, domestic buildings, all of which have either a natural diversity of form as the direct outcome of their purpose or have so dominant a practical end as to render superficial decoration unnecessary, superfluous or, maybe, quite inappropriate. In buildings of these types too, the scientific devices, methods and materials of the machine-age were more fitting than the expedients of earlier historical times, and gave the freer play to the expression of the present-day developing taste for the subtle inter-play of simple, if subtle, forms and the opposition of cleanly textured and chastely coloured or patterned surfaces. Reference to the examples of Modern architecture already named will demonstrate these points; but besides, one may refer to the many splendid bridges, in concrete or steel, or these combined, which afford some among the finest illustrations of the Modern architectural—and engineering—art. French, Swiss and American designers

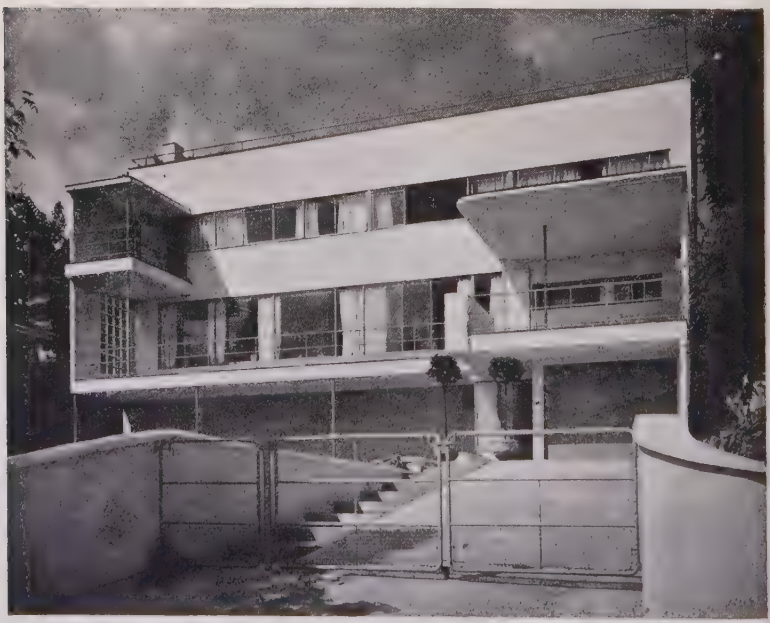
130. THE PHILADELPHIA SAVING FUND SOCIETY BUILDING, PHILADELPHIA, PA.

Howe and Lescaze, Architects

131. THE WHITESTONE BRIDGE, BRONX, N.Y.

O. H. Amman, A. Dana and A. Embury, Designers

132. THE CAPITOL OF THE STATE OF NEBRASKA, LINCOLN, U.S.A.
B. G. Goodhue, Architect



133. SUN HOUSE, HAMPSTEAD, LONDON
E. Maxwell Fry, Architect

have excelled in this class. Switzerland, of course, has a special need for bridges in view of its difficult terrain. By the new techniques, harbour and estuary bridges of magnificent scope have become practicable which might have been impossible before, as, for instance, the Whitestone Bridge, Bronx, New York (1930) (131). As time progresses, urban public buildings of the higher social types are finding suitable expression in the Modern vein, and art or craft decoration is no longer abhorred, provided that these clearly demand it as a proper part of their function.

In the increasing thought which is being given to the pattern and appearance of towns as a whole, groups of buildings more often are harmonious one with another than was formerly the case; in the materials used, their shapes and dimensions, and in the importance attaching to their mutual settings and surroundings. The " Garden Cities " earlier referred to, and the many residential developments which reflect their principles are in this sense certainly Modern, even though the buildings within them may have an old-fashioned air. This kind of improvement generally applies, too, to the Government-sponsored or private " Trading Estates ", of the type initially founded between the two wars with the object of restoring prosperity to the then industrially-depressed areas. The Team Valley group of factories, near Newcastle-on-Tyne, is a leading example of comprehensive orderly design. The enhanced care now commonly devoted to the formalised or natural environment of buildings is in substantial part due to the recognition of its high importance in providing a decorative foil to the sparing lines of Modern architecture. In large national exhibitions of recent times, the adjuncts to buildings—flags and banners; kiosks, fountains and terraces; flower-beds and boxes; topiary work and temporarily planted flowering shrubs—are expressly exploited to give an exceptional liveliness and variety to the scene.

In suchwise are the ideals of Modernism in architecture and town and garden design now established everywhere, and though they are yet far from universally accepted, revivalism is undoubtedly giving way. The hey-day of this great, as yet imperfectly-named international movement is yet to come.

A BRIEF LIST OF BOOKS RECOMMENDED TO STUDENTS

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The Art of Town Planning.	Lanchester, H. V.
Form and Colour.	Phillips, L. March.
History of Ancient Art. Vols. on Ancient Chaldaea, Egypt, Phrygia, Primitive Greece, Phoenicia, etc.	Perrot and Chipiez.
History of Architecture.	Hamlin, A. D. F.
History of Architecture.	Sturgis and Frothingham.
A History of Architectural Development.	Simpson, F. M.
History of Architecture in all Countries.	Fergusson, J.
A History of Architecture on the Comparative Method.	Fletcher, Sir B.
Outline of European Architecture.	Pevsner, N.
A Short Critical History of Architecture.	Statham, H. H.
The Works of Man.	Phillips, L. March.

General—Great Britain

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The English Garden.	Dutton, R.
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The Glory that was Greece.	Stobart, J. C.
Greek Buildings.	Lethaby, W. R.
Greek Cities in Italy and Sicily.	McIver, J. R.
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How the Greeks Built Cities.	Wycherley, R. E.
The Palace of Minos.	Evans, Sir A.
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INDEX

(The numerals in brackets refer to the figure numbers of illustrations)

AALTO, Alvar, architect, 209
Abacus, 7, 35
Abbaye-aux-Dames (La Trinité), Caen, 101
Abbaye-aux-Hommes (S. Étienne), Caen, 99, 100, (59)
Abbeville, S. Vulfran, 113
Abbey, Buildwas, 118
  Fountains, 118, 119
  Melk, 145, 154, (99)
  Mont S. Michel, 112
  Westminster, 101, 121, 122, 157, 179, (77)
Abou Simbel, Great Temple, 13, (4)
Abydos, Temple at, 9
Acropolis, Athens, 35
Adam, Brothers, architects, 170–171, 172, 185, (116)
Adelphi, London, 171
Admiralty, Screen, London, 171
Aegean Architecture, 21–29
  Palaces, 22–28, (14), (15), (16), (19)
  Tombs, 22, 28–29, (17)
Agamemnon, Tomb of (see Treasury of Atreus)
Agrigentum, Temples at, 38
Agrippa, baths of, Rome, 69
Albert Memorial, London, 181
Alberti, architect, 133–134
Altar, in Early Christian churches, 80
Ambo, 78, 81, (49), (50)
Amiens, Cathedral, 111, 112, 119, 120, (68), (74)
  compared with Salisbury Cathedral, 119, 120, (71), (73)
Ammanati, architect, 149
Amphitheatres, Roman, 60, 65–66, (37)
  Colosseum, 64, 66, (37)
Angle buttress, 115
Anta, 26, 62
Antefixae, 41
Antinori Palace, Florence, 135
"Antiquarian" phase, Definition, 156, 170
Apollo Epicurius, Temple of, Bassae, 39, 42, 43
Apse, 70, 77, 80, (48)
Arc de Triomphe, Paris, 151
Arc du Carrousel, Paris, 151
Arch principle, 8, 18, 46, 49–50, 53–54
  Pointed, 101, 104, 106, 107, 109
Arch, Constantine, Rome, 68 (41),
  Septimius Severus, Rome, 68
  Titus, Rome, 67
  Triumphal (Basilican church), 80
  Triumphal, Roman, 60
Archaic Temple of Artemis, Ephesus, 39–40, (18), (24)
Architecture, Orders of
  Greek, 32–33, 39, 41, 42, (23)
  Roman, 61–62
Architrave, 36
Arcuated architecture defined, 53–54
Arles, S. Trophîme, 98
Arnolfo del Cambio, architect, 126, 129
Artemis, Temple of, Ephesus
  Archaic, 39–40, (18), (24); Later, 39, 40–41
Art Nouveau, 198, 204–205, 206, 207, 208, 210
Arts and Crafts Movement, 197, 198, 204, 207, 208
Ashridge Castle, Herts, 174
Asplund, G. architect, 209
Assam Brothers, architects, 154
Assisi, S. Francesco, 125
Assyrian architecture, 16, 17–19
Astylar (columnless) architecture, 178, (88)
Athens, Acropolis, 35
  Erechtheum, 43, 178, (23), (25), (26)
  Lysicrates, Monument of, 44, 186, (27)
  Parthenon, 35–38, 42, 88, 186; (21), (22), (23)
  Propylaea, 42, 184
  Temple of Nikè Apteros, 42
  Temple of Zeus Olympius, 45, 68
  Theatre of Dionysus, 45
  Theseum, 38
  Tower of the Winds, 173, 178
Atreus, Treasury of, Mycenae, 29, (17)
Atrium, 52, 72, 77, 78, 81, (49)
Attic, 54
Audley End, Essex, 160
Augustus, Mausoleum of, 51
Autun Cathedral, 99
Auvergne, Romanesque churches, 98
Avignon, Notre Dame, 98
Azay-le-Rideau, Chateau of, 147

BABYLON, City of, 17
Babylonian architecture, 16–17
Bacon, H., architect, 202, (129)
Baldacchino, 78, (50)
Ball-flower, 115, 124, (69)
Baltimore Cathedral, 187
Baluster, origin of, 54, 137
Baluster mullions—Saxon, 102, (65)
Bank of England, Bristol, 178
  Liverpool, 178
  London, 175
  Manchester, 178
Bank of Pennsylvania, Pa., 186
Banqueting Hall, Whitehall, London, 161, (105)
Baptistery, Florence, 130, (84)
  Pisa, 94
  Ravenna, 86
Baroque, Definition, 144–145, 150
Barry, Sir C., architect, 178, 179, (120)
Basevi, G., architect, 175, 178

Basilica, 60, 69–71, 75–76, (44)
of Constantine, 59, 60, 71
Julia, 65, 70
"Palladiana," Vicenza, 144
of Trajan, 69–71, (44)
Ulpia (see Trajan)
Bassae, Temple of Apollo Epicurius, 39, 42, 43
Bath, Houses at, 176
Prior Park, 168
Royal Crescent, 168
Baths (Thermae), Roman, 60, 69
Agrippa, 69
Caracalla, 69
Diocletian, 69, (39), (42)
Nero, 69
Trajan, 64, 69, 74
Vespasian, 69
"Battle of the Styles," 176, 179, 200
Battlements, 18, 116
Bauhaus, Dessau, 209
Bay window, 158, (102)
Bayonne Cathedral, 110
Beauvais Cathedral, 111, 112
Beckford, Lord William, 174, 175
Behrens, Peter, architect, 206
Bell, H., architect, 165
Bell tower (see campanile)
Belvedere, Vienna, 153
Bema, 80, 81
Benedetto da Maiano, 135, (87)
Benedictines, 101, 103
Beni-Hasan tombs, 7, 8, 36, (6)
Bentley, John F., architect, 181
Bergamo, Colleone Chapel, 137
S. Maria Maggiore, 127
Berlage, H. P., architect, 206
Berlin, Brandenburg Gate, 184
Houses of Parliament, 184
Museum, 184
Turbine Factory, 206
Bernini, architect, 142
Bexhill Pavilion, 210
Birds-beak moulding, 104
Birs-Nimroud, Ziggurat, 17
Bishops' Thrones, 72, 82
Black Death, 114
Blenheim Palace, Oxford, 165, (107)
Blois, Chateau of, 146
Orleans wing, 148
Bologna, Madonna di S. Luca, 145
S. Petronio, 125
Boodle's Club, London, 171
Borghese, Villa, Rome, gateway to, 183
Boss, 115
Boston, Lincs, church at, 123, 179
Bourges Cathedral, 110, 111, 112
House of Jacques Coeur, 113
Bournville, Town Planning at, 195
Bow Church, Cheapside, London, 164, (112)
Bradford, "Saltaire," 195
Bradford-on-Avon, S. Lawrence, 101, (64)
Bramante, architect, 136–139
Brandenburg Gate, Berlin, 184
Breur, M., architect, 209
Bridges, iron
Britannia Tubular, Menai Straits, 189
Brooklyn, 191
Clifton Suspension, Bristol, 189
Coalbrookdale, 189
Conway Suspension, 189
Bridges, iron
Forth, 191
High Level, Newcastle-on-Tyne, 189
Hudson, 191
Menai Suspension, 189
Old London Bridge, 189
Sunderland, 189
Sydney Harbour, 191
Tubular, Conway, 189
Whitestone Bridge, Bronx, New York, 211, (131)
Brighton Pavilion, 176
Bristol, Bank of England, 178
Clifton Suspension Bridge, 189
Britannia Tubular Bridge, Menai Strait, 189
British Museum, 178, 179
Assyrian sculptures, 17
Elgin marbles, 37
Halicarnossos sculptures, 46
Brooklyn Bridge, 191
Brou, church at, 113
Brown ("Capability"), L., garden designer, 175
Brunel, I. K., engineer, 189
Brunelleschi, architect, 129–135, 138, 142
Brunswick, Gewandhaus, 152
Bückeberg church, 152
Buckingham House, 165
Buckingham, J. S., 195
Burdon, R., architect, 189
Burghley House, Stamford, 159
Burlington, Lord, architect, 166, 167
Burton Decimus, architect, 175, 178
Butterfield, William, architect, 182, (122)
Buttresses, Angle, 115
Flying, 60, 99, 104, 108, 109, 111, 119, 121, 163, (72)
Gothic, 60, 107–109, 115, 122
Renaissance, 152
Roman, 60, 61
Romanesque, 104
Byzantine Construction, 59, 84–86, (52)
Byzantine influence: in Greece, Asia Minor and Russia, 91
on Italian Renaissance architecture, 132, 137–138, 142
on Tuscan Romanesque, 95, (84)

Cadburys', Bournville, 195
Cà d'Oro, Venice, 128, (79)
Caen, Abbaye-aux-Dames (La Trinité), 101
Abbaye-aux-Hommes (S. Étienne), 99, 100, (59)
Caere (see Cerveteri)
Cahors Cathedral, 97
Callicrates, architect, 38
Callimachus of Corinth, architect, 43
Cambio, Arnolfo del, architect, 126, 129
Cambridge, Fitzwilliam Museum, 178
King's College Chapel, 122, 157, (76)
King's College, Gothic Revival work at, 179
Trinity College, Gothic Revival work at, 179
Trinity College, Library, 165
Campanile (bell tower), 82, 93, 94, (57)
Campbell, Colin, architect, 166, 185
Cancelleria, Palace, Rome, 139
Canina, architect, 183
Canterbury Cathedral, 101, 118–119, (75)

Capitol, Virginia, U.S.A., 186
Washington, 186
Capra Villa, Vicenza, 144, 166, (92)
Caprarola, Farnese palace, 144, (91)
Caracalla, Baths of, Rome, 69
Cardiff, Civic Centre, 200
City Hall, 200, (128)
Carlisle Cathedral, 121
Carlton House, London, 176
Carr, John (of York), architect, 168
Carrousel, Arc du, Paris, 151
Carytid, 43, (26)
Casa di Livia, Rome, 71
Casa Pollini, Siena, 140
Casino, Marino, Dublin, 169
Cast Iron, 189, 190, 192
Castle, Mereworth, 166
S. Angelo, Rome, 51
Stokesay, 123, (78)
Windsor, 122, 176
Castle Howard, Yorkshire, 165
Castle Riding Church, 105
Castor and Pollux, Temple of Rome, 63
Catacombs, Rome, 52
Cenotaph, Whitehall, London, 201
Certosa, Pavia, 126–127, 137
Cerveteri, Etruscan remains at, 50, 52, (29)
Chalgrin, J. F., architect, 151
Chambers, Sir W., architect, 169, 170, 185, (104)
Chambord, Chateau of, 146–147, (94)
Chambre des Députés, Paris, 151
Chancel, early form of, 78, (49), (50)
Chapter House, 122
Château of Azay-le-Rideau, 147
Blois, 146
Chambord, 146–147, (94)
Maisons, Paris, 148, (97)
Mesnières, Dieppe, 147
Orleans wing, Blois, 148
Chatres Cathedral, 110, 111, 112, (72)
Cheltenham, Regency houses, (109)
Cheops, Pyramid of, 4–6, (2), (5)
Chephren, Pyramid of, 4
Chermeyeff, S., architect, 210
Chevet, 98, 99, 103, 111, 119, 121, (62)
Chicago, Home Insurance Co. Building, 193
Chiswick, Chiswick House, 166–167, (110)
Choir (see Chancel)
Choragic Monument of Lysicrates, 44, 186, (27)
Christ Church, Oxford, 123
Christianity, introduction of, 64–65, 75–76
Circus, Bath, 168
Circus Maximus, Rome, 66–67
City Hall, Cardiff, 200, (128)
Civic Centre, Cardiff, 200
Civic Design, 150, 168, 176
Civita Castellana, Etruscan temple at, 53, (30)
Cleopatra's Needle, London, 10
Clerestory, 10. 12, 70, 123, 151, 163, (7), (8), (45)
Clermont Ferrand, Notre Dame du Port, 98–99, 111, (62), (63)
Clifton, Bristol, Suspension Bridge, 189
Cloister, 81
Coalbrookdale, Iron Bridge, 189
Colleone Chapel, Bergamo, 137
"Colonial" architecture in the U.S.A., 166, 184–5
Colosseum, Rome, 64, 66, 134, (37)
Colossi of Memnon, 10
Columns and piers, Egyptian, 7–8, 14–15
Aegean, 25–26
Byzantine, 88
Early Christian, 77, 82, 83
English Renaissance, 157, 158, 160–161, 171–172, 201
French Renaissance, 147, 150, (96)
Gothic, 107, 115–116, 118–119
Greek, 31, 32, 35–37, 39, (23)
Italian Renaissance, 133, 134, 139, 140, 144
Persian, 19, 20
Roman, 53–54, 61–62, 68
Composite order, 61, 62, (39)
Compton Wynyates, Warwickshire, 156
Concrete, 194–195, 206, 209
Roman, 56–59
Confessio, 80
Connell, Ward and Lucas, architects, 210
Constantine, Arch of, 68, (41)
Basilica of, 59, 60, 71
Constantinople, 10, 76, 85, 88, 89, 90
Sta Sophia, 85–86, 88, 89, (43)
Conway Suspension Bridge, 189
Tubular Bridge, 189
Corbel Table, 105
Corbelled construction, 5, 28
Corinth, 55
Corinthian Order, 33, 42, 43–45, (27)
Roman version, 61, 62
Cosmato work, 82
Court of Honour, 148
Covent Garden, London, Church of S. Paul, 161
Cronaca, architect, 135
Crypt, 80
Crystal Palace, London, 190, 191, (124)
Cubbitt, Lewis, architect, 192
Cumberland Terrace, Regent's Park, 175, (117)
Curvilinear style, 114, 115–119
Cymatium, 41

Dahsur, Pyramid, 4
Dance, George, senior, architect, 168
Dance, George, junior, architect, 168–169, (114)
Decorated Style, 115, 121, 122, 124
Delhi, Government buildings at, 201
Delos, "Maison de la Colline," 47, (32)
Delphi, round temple, 44
Denderah, temple at, 9, 13
Dentils, 41
Dessau, the Bauhaus, 209
Destruction of Roman Monuments, 64–65
Diagonal rib, 100
Dieppe, S. Jacques, 113
Diocletian, Baths of, Rome, 69, (39), (42)
Dionysus, Theatre at, Athens, 45
Dipteral, 39
Divinity Schools, Oxford, 122
Dobson, John, architect, 176
Doge's Palace, Venice, 127–128
Dog-tooth ornament, 115, 124, (75)
Domes, Assyrian, 18
Byzantine, 84, 85, 86, (52)
Florence Cathedral, 126, 129–133, 142, (84)

Domes, German Renaissance, 154, 155
of the Invalides, Paris, 149
Pantheon, Paris, 151, (89)
Pantheon, Rome, 59, 60–61, 68–69, (35), (38)
Romanesque, 94
S. Paul's, London, 163–164, (108), (111)
S. Peter's, Rome, 68, 142–143, (90)
Domestic Architecture, Egyptian, 15–16
Aegean, 22–28
Greek, 47
Roman, 71–74
Dominican Order, 112
Donatello, sculptor, 130
Doric Order, 32–33, 34, 35–37, 105, (21), (23)
Egyptian similar type, 7–8, (6)
Etruscan copying of Greek, 52, 61
Roman version, 61
Dormer window, Chateau of Chambord, (94)
Dosseret, 83, 88, 95, (51)
Drury Lane Theatre (demolished), London, 171
Dublin, Casino at Marino, 169
Durham Cathedral, 95, 103–104, 111, 118, 120, 122, 173, (1), (61)

Earls Barton, 101
Early English style, 115, 124
Early Tudor style, 114, 115–116, 156
Echinus, 35
Edfou, temple at, 13, 14, (3)
Edinburgh, 171
Eiffel, Gustave, 192
Eiffel Tower, Paris, 192
Electric lift, 193
Elgin marbles, 37
Elizabethan style, 123, 156, 160
Revival, 197
Elmes, H. L., architect, 178
Ely Cathedral, 112, 119
Emmet, architect, 192
Empire State Building, New York, 202–203
Empire Style, 151
Endell, architect, 205
Entablature, 35
Entasis, 35, 37
Ephesus, Archaic temple of Artemis, 39–40, (18), (24)
Later temple of Artemis, 39, 40–41
Epidaurus, round temple, 44
theatre, 45–46, (31)
Erechtheum, Athens, 43, 178, (23), (25), (26)
Erlach, Fischer von, architect, 153, 154, (100)
Etruscans, Settlement in Italy, 48
Art of, 49, 52, 53
City gates, 50, (28)
Construction, 49
Temples, 49, 53, (30)
Terra cotta, 53
Tombs, 49–53, (29), (33)
Euston station, 191
Evans, Sir Arthur, 23
Evelyn, John, 160, 162
Exhibition, Great, of 1851, 190–191, (124)

Falerii, Etruscan works at, 50
Fan-vaulting, 122, (76)
Farnese Palace, Caprarola, 144, (91)
Farnese Palace, Rome, 139, (88)
Farnesina Palace, Rome, 139
Fergusson, J., quoted, 10, 69, 116, 163
Ferrara Cathedral, 125
Fisher von Erlach, architect, 153, 154, (100)
Fitzwilliam Museum, Cambridge, 178
Flats, Roman, at Ostia, 72
Flèche, 120
Fleur-de-Lys ornament, 115, 124
Flint-work, 124
Flitcroft, architect, 168
Florence, Baptistery, 130
Cathedral, 125, 126, 129–133, 142, (83), (84)
Giotto's Campanile, 127, 132, (84)
Or San Michele, 129
Palaces
Antinori, 135
Guadagni, 135
Pandolfini, 135
Riccardi, 135
Rucellai, 134
Strozzi, 135, (87)
Vecchio, 127
Pazzi Chapel, 133
S. Lorenzo, 133
S. M. Novella, 134
S. Miniato, 92, 94, (60)
S. Spirito, 133
Florentine Arcade, 133, 139
Flying Buttress, 60, 99, 104, 108, 109, 111, 119, 121, 163, (72)
Foliated capital (Early English), 115, 124, (82)
Fontainbleau, Palace, 146
Fontana, architect, 142
Fonthill Abbey, Wilts, 174, (115)
Forth Bridge, 191
Fortuna Virilis, temple of, Rome, 62–63, 65, (40)
Forum (Romanum), Rome, 65
Forum of Trajan, Rome, 60, 68
Foscari Palace, Venice, 128
Four-centred arch, 116
Franciscans, 125
François Premier style, 146
French Order, The, 140, (96)
Fry, Maxwell, architect, 210

Gabriel, J. A., architect, 150, (95)
Gabriel, J. J., architect, 150
Garden Cities, 195–196, 203–204, 211
Garden design, 149, 150, 153, 154, 167, 175, 176, 177 182
Garnier, Charles, architect, 183
Garnier, Tony, 206
Gateway at Hyde Park Corner, London, 178
Geometrical style, 114, 121
Gewandhaus, Brunswick, 152
Ghiberti, architect, 130–131
Gibbs, James, architect, 165, 166, 185
Gilbert, Cass, architect, 202
Giotto's Campanile, Florence, 127, 132, (84)
Girault, architect, 183
Glasgow School of Art, 198–199, 205, (126)
Glass, 182, 188, 191, 193, 201, 205, 206
Glass, stained, 108, 109–110, 111
Gloucester Cathedral, 104
Golden House of Nero, Rome, 64
Goodhue, B., architect, 207
Gothic Revival, 173–174, 179, 183, 187, 191, 193, 197, 202

Government Buildings, Delhi, 201
Graeco-Roman architecture, 31
Grand Palais, Paris, 183
Grantham, church at, 123
Great Hall of Xerxes, Persepolis, 19, (9), (13)
Great Pyramid, 4–6, (2), (5)
Great temple at Abou Simbel, 13, (4)
"Greek Cross" plan, 88, 142, 162–163
Greek dwellings, 47, (32)
Greek Revival, 178–181, 183, 184, 186
Greenwich Hospital, 165
  Queen's House, 161
Gropius, Walter, 207, 209, 210
Guadagni Palace, Florence, 135

HADDON HALL, Derbyshire, 157–158, (102)
Hadrian, Mausoleum of, 51
Hadrian's Wall, England, 57
Half-timber, 113
Halicarnassos, Mausoleum, 46, 202
Hall of the Hundred Columns, Persepolis, 19
Halle des Machines, Paris, 191
Hammer-beam roof, 123, (80)
Hampstead Garden Suburb, 204
Hampton Court Palace, 165
Hardwick Hall, 158
Hardwick, Philip, architect, 191
Hawksmoor, Nicholas, architect, 165
Heaton Hall, Manchester, 172
Heaveningham Hall, Suffolk, 172
Heidelburg Castle, 152
Hellenic period of Greek architecture, 30
Hellenistic period of Greek architecture, 30
Henry VII's Chapel, Westminster, 122, (77)
Heraeum, Olympia, 30, 33–34
Herculaneum, houses at, 71
  buried city, 145, 170, 171
Hereford Cathedral, 173
High Level Bridge, Newcastle-on-Tyne, 189
High Point Flats, London, 210
Hildebrandt, J. L. von, architect, 153
Hittorf, architect, 151
Hofburg, Vienna, 153
Hoffmann, architect, 205, 206
Holland, Henry, architect, 176
Holkham Hall, Norfolk, 167
Holy-water Stoup, 81
Home House, 20, Portman Square, London, (116)
Home Insurance Co. Building, Chicago, 193
Horse Guards, Whitehall, London, 167, 171, (113)
Hortensius, House of, Rome, 71
Hospital, Greenwich, 165
Hôtel des Invalides, Paris, 145, 149, 151
Hôtel de Ville, Paris, 148
  Rouen, 113
Houses, Aegean, 23–27
  Etruscan, 52–53, 72
  Greek, 47, 72, (32)
  Pompeian, 23, 71–74, (46), (47)
  Roman, 71–74
House of Livia, Rome, 71
  of Pansa, Pompeii, 72–73, (47)
  of the Surgeon, Pompeii, 72, (46)
Houses of Parliament, Berlin, 184
  London, 179, (120)
  Vienna, 184
Howard, Ebenezer, 195, 203
Howe and Lescaze, architects, 209, (130)
Hudson, Bridge, 191
Hypostyle Hall, Karnak, 10–11, (7), (8)
  Ramesseum, 12, (11)

ICTINUS, architect, 38, 42, (21)
Iffley, Church, Oxford, 104
Impington Village College, Cambs., 210
Impluvium, 73
Inigo Jones, architect, 156, 161–162, (105)
"Inigo Jones" period, 156
Invalides, church of the, Paris, 145, 149
Inwood, H. W., architect, 178
Ionic Order, 32, 39, 41, (23), (25), (26)
  Etruscan copying of, 52
  Roman version, 61
Iron, 182, 188–192, 193
Issoire, S. Austremoine, 98, 99

JACOBEAN style, 156, 160
Jacques Coeur, House of, Bourges, 113
Jefferson, Thomas, architect, 186
Jones, Inigo, architect, 156, 161–162, (105)
Julia, Basilica, Rome, 65, 70

KARLSKIRCHE, Vienna, 153, (100)
Karnak, Great Temple of Ammon, 9, 10, 11, 14, 19, (7), (8)
Keble College Chapel, Oxford, 182, (122)
Kedlestone Hall, Derbyshire, 171
Kent, William, architect, 166–168, 175, (110), (113)
Khorsabad, Palace of Sargon, 17, (10, (12)
King's College Chapel, Cambridge, 122, 157, (76)
King's Cross Station, 192
King's Lynn, Custom House, 165
Kingston House, Bradford-on-Avon, 160
Kingsway, London, 201
Klenze, architect, 184
Knole House, Kent, 160
Knossus, Crete, Palace at, 22, 23, 24, (14)

LABEL mould, 115
Labrouste, architect, 183
"Lancet" style, 114, 115, 119
Lancet window, 115
Landscape gardening, 175, 176
Langley, Batty, architect, 185
Laon Cathedral, 110, 111
L'Art Nouveau, 198, 204–205, 206, 207, 208, 210
La Trinité, Caen (see Abbaye-aux-Dames)
Lateran Church (see S. John Lateran)
"Late Tudor" style, 156
Latin-Cross plan, 92, 142, 163
Latrobe, B. H., architect, 186
"Leaning Tower," Pisa, 94, (57)
Leaded glass, 96, 110
Le Corbusier, architect, 209
Lee Priory, Kent, 174
Lemgo, Rathhaus (Town Hall) Portico, 152
Le Nôtre, garden architect, 149, 150, 154
Leoni, architect, 166
Lescaze, W., architect, 209
Lescot, architect, 147
Letchworth Garden City, 195, 204
Lethaby, Professor W. R., 114, 115, 119
Library of S. Geneviève, Paris, 183, 193

Library of S. Mark, Venice, 141, (85)
Limoges Cathedral, 113
Lincoln Cathedral, 119, 120, 122
Lincoln Memorial, Washington, U.S.A., 202, (129)
Lincoln, U.S.A., Nebraska State Capitol, 207, (132)
Lion Gate, Mycenae, 28, 29, (19)
Lion Porch of Lombardy, 93, (58)
Lisieux Cathedral, 110
Liverpool Anglican Cathedral, 202
  Bank of England, 178
  R.C. Cathedral, 202, (127)
  S. George's Hall, 178
Livia, House of, Rome, 71
Lombardo, Pietro, architect, (86)
Lombardy, Lion Porch of, 93, (58)
London, Adelphi, 171
  Admiralty Screen, Whitehall, 171
  Albert Memorial, 181
  Bank of England, 175
  Banqueting Hall, Whitehall, 161, (105)
  Boodle's Club, 171
  Bow Church, Cheapside (see S. Mary-le-Bow)
  British Museum, 178, 179
  Carlton House (demolished), 176
  Cenotaph, Whitehall, 201
  Chiswick House, 166–167, (110)
  Cleopatra's Needle, 10
  Cumberland Terrace, Regent's Park, 175, (117)
  Crystal Palace, 190, 191, (124)
  Drury Lane Theatre (demolished), 171
  Euston Station, 191–192
  Gateway at Hyde Park Corner, 178
  Hampstead Garden suburb, 204
  High Point Flats, 210
  Home House, 20, Portman Square, (116)
  Horse Guards, Whitehall, 167, (113)
  Houses of Parliament, 179, (120)
  Hyde Park Corner, Archway at, 178
  King's Cross Station, 192
  Kingsway, 201
  London Bridge, design for, 189
  National Gallery, 178
  Newgate Prison (demolished), 169, (114)
  Pantheon (demolished), 172
  Queen's House, Greenwich, 161
  Reform Club, 178
  Regent's Park Buildings, 175 ,(117)
  Regent Street (Nash), 175, 201
  R.I.B.A. Headquarters, 200, (125)
  S. Bride, Fleet Street, 165
  S. Dunstan-in-the-West, 179
  S. George, Bloomsbury, 165
  S. James, Piccadilly, 165
  S. Martin-in-the-Fields, 165
  S. Mary Woolnoth, 165
  S. Mary-le-Bow, Cheapside, 164, (112)
  S. Mary-le-Strand, 165
  S. Pancras Church, 178, (119)
  S. Pancras Station, 181, 191–192
  S. Paul, Covent Garden, 161
  S. Paul's Cathedral, 89, 133, 145, 151, 162–164, (108), (111)
Somerset House, 169, (104)
Sun House, Hampstead, 210, (133)
Temple Bar, 162
Temple Church, 119
London, Travellers' Club, 178
  Underground Railway Offices, 201
  University College, 178
    New Buildings, 201
  Westminster Abbey, 101, 120, 122, 157, 179–180, (77)
  Westminster Hall, 120
  York Water Gate, 161–162
"Long Gallery," 158, (102)
Longhena, architect, (93)
Longleat, Wilts, 160
Longmeadow, Massachusetts, U.S.A., Church at, (123)
Loos, Adolf, architect, 206, 207, 209
Louvre, Palace of the, Paris, 147, 148, 150, (98)
Lurçat, André, architect, 209
Lutyens, Sir E., 201, (127)
Luxembourg Palace, Paris, 148
Luxor, Temple of Ammon at, 9, 14
Lysicrates, Monument, Athens, 186, (27)

Mackintosh, C. R., architect, 198–199, 205, (126)
Madeleine Church, Paris, 151
Maderna, architect, 142, 143
Maiano, Benedetto da, architect, 135, (87)
Maison Carrée, Nîmes, 65, 186, (36)
"Maison de la Colline," Delos, 47, (32)
Maisons, Château of, near Paris, 148, (97)
Malmesbury Abbey, 118
Manchester, Bank of England, 178
  Heaton Hall, 172
  Wythenshawe, 204
"Mansard" roof, 149
Mansart, F., architect, 148, (97)
Mansart, J. H., architect, 149
Marbles, Roman, 65, 68, 76, 91
  Byzantine, 87, 88
  Early Christian, 76, 81
  Gothic, 125, 126, 127, 128
  Renaissance, 134, 136, 137, 138
  Romanesque, 95
Marcellus, Theatre of, Rome, 64
Marcus Aurelius, statue of, 65
Marienkirche, Wolfenbüttel, 152
Marino, Casino at, 169
Marsuppini Monument, S. Croce, Florence, 136
Mars Ultor, Temple of, Rome, 63
Martorana Chapel, Palermo, 87
Massimi Palace, Rome, 140
Mater Matuta, temple of, Rome, 62–63, 65, (40)
Mausoleum of Augustus, Rome, 51
  of Hadrian, 51
  at Halicarnassos, 46, 202
McIntyre, Samuel, 185
McKim, Mead and White, architects, 187, 202
Mêdûm, pyramid at, 4
Megaron, Tiryns, 25, (15)
Melk, Monastery at, 145, 154, (99)
Memnon, Colossi of, 10
Menai, Britannia Tubular Bridge, 189
  Suspension Bridge, 189
Mendelssohn, architect, 209, 210
Mereworth Castle, Kent, 166
Mesnières, Château of, Dieppe, 147
Metope, 36, (23)

Michelangelo, architect, 65, 134, 139, 141–143, (90)
Michelozzo, architect, 135
"Mid-Gothic" (Geometrical) style, 114, 115
Milan Cathedral, 125, 126
  Fortifications at, 140
  S. Ambrogio, 91, 92, 94, 100
  S.M. delle Grazie, 137
  S.M. presso S. Satiro, 137
Minoan Architecture, 23
Mint, Philadelphia, U.S.A., 186
Modern Architecture, 196–198, 200, 203–211
Mohammedans, in Sicily, 95
Monastery, Melk, 145, 154, (99)
  S. Florian, 154
Monreale Cathedral, 87, 95
Mont S. Michel, 112
Montacute House, near Yeovil, 158, 160, (103)
Monticello, 186
Monument of Lysicrates, Athens, 44, 186, (27)
Morris, Robert, architect, 168
Morris, William, 197, 198, 205
Mortar, Roman, 56, 57
Mosaic, 81, 86, 87–88, 89, 95, 125, 126
Mouldings (medieval), 115–116, 124
Munich, S. John Nepomuk, 154
  Ruhmeshalle, 184
Musée Galliera, Paris, 183
Museum, Berlin, 184
  British, 178, 179
  Fitzwilliam, Cambridge, 178
Mycenae, Palace at, 24, 26, 28
  Lion Gate, 28, 29, (19)
  Treasury of Atreus, 29, (17)
Mykerinos, Pyramid of, 4

Nancy, Place Stanislaus, 150
Narbonne Cathedral, 113
Narthex, 77, 80, 81
Nash, John, architect, 175, 176, (117)
National Gallery, London, 178
Nebraska State Capitol, Lincoln, U.S.A., 207, (132)
Nebuchadnezzar's Palace, Babylon, 17
Nero, Baths of, 69
  Golden House of, 64
Neumann, B., architect, 153, 154, (101)
Neutra, R., architect, 209
Newcastle-on-Tyne, High Level Bridge, 189
  Town Planning, 176
New Delhi, 201
Newgate Prison, London, 169, (114)
New York, Custom House, 186
  Empire State Building, 202–203
  Pierpont Morgan Library, 187
  Trinity Church, 187
  Whitestone Bridge, Bronx, 211, (131)
  Woolworth Building, 202
Nikè Apteros temple, Athens, 42
Nîmes, Maison Carrée, 65, 186, (36)
Nimroud, Ziggurat, 17
Nineveh, Royal Palace, 17
Nippur, Ziggurat, 17
Norman Architecture in England, 96, 100, 102–105, 106, (61)
  in France, 96, 99–101, 106, (59)
  in Sicily, 95, (55)
Norwich, S. Stephen's, (80)
Norwich, Town Hall, 200
Notre Dame, Avignon, 98
Notre Dame du Port, Clermont Ferrand, 98–99, (62), (63)
Notre Dame, Paris, 110, 111, 112

Obelisk, Cleopatra's Needle, London, 10
  at Constantinople, 10
  at New York, 10
  at S. John Lateran, Rome, 9
Olbrich, architect, 205
Old Custom House, New York, 186
Old London Bridge, new design for, 189
Old Library of S. Mark, Venice, 141, (85)
Old Newgate Prison, London, 169, (114)
Old S. Peter's, Rome, 78, 80, (45)
Olympia, Heraeum, 30, 33–34
  Round temple, 44
  Temple of Zeus, 38–39
Open timber roofs, 115, 123, (80)
Opera House, Paris, 183, (121)
Optical refinements, 35, 36–37
Opus Alexandrinum, 81
Orders of Architecture, Greek, 32–33, 39, 41, 42, (23)
  Italian Baroque, 141, 144–145, 150
  Renaissance, 62, 133, 134–135, 139, 140, 141, 143
  Roman, 54, 61–62, 65, (39)
Orientation of churches, 78, 80
Orme, Ph. de l', architect, 140, 148, (96)
Or San Michele, Florence, 129
Orvieto Cathedral, 125, 126
Osirid pillars, 10, 13
Ostberg, Professor R., architect, 202
Osterley Park, Middlesex, 171
Ostia, Roman flats at, 71–72
Oud, J. J. P., architect, 209
Owen, Robert, 195
Oxford, Christ Church College, 123
  Divinity Schools, 122
  Keble College Chapel, 182, (122)
  Radcliffe Observatory, 172, (118)
  S. Mary, 161
  Sheldonian Theatre, 165
  Taylor Institution, 178

Pacassi, architect, 154
Paestum, temples at, 38
  Temple of Poseidon, 32, 34, (20)
Paine, James, architect, 168, 171, 185
Painted glass (see stained glass)
Palaces, Antinori, Florence, 135
  at Babylon, 17
  Belvedere, Vienna, 153
  Blenheim, 165
  Ca' d'Oro, Venice, 128, (79)
  Cancelleria, Rome, 139
  Caprarola (Farnese), 144, (91)
  Doge's, Venice, 127–128
  Ducal, Venice, 127–128
  Farnese, Caprorola, 144, (91)
  Rome, 139, (88)
  Farnesina, Rome, 139
  Fontainebleau, 145
  Foscari, Venice, 128
  Grand, Paris, 183
  Guadagni, Florence, 135
  Hall of the Hundred Columns, Persepolis, 19

Palaces, Hampton Court, London, 165
Hofburg, Vienna, 153
Khossabad (Sargon), 17–18, (10), (12)
Knossus, Crete, 24, 27, (14)
Louvre, Paris, 147, 148, 150, (98)
Luxembourg, Paris, 148
Massimi, Rome, 140
Mycenae, 24, 26, 28, (19)
Nineveh, 17
Pandolfini, Florence, 135
Persepolis, 19, (9), (13)
Phaestos, Crete, 27
Petit, Paris, 183
Pisani, Venice, 128
Pitti, Florence, 148
Pompeii, Verona, 140
Pubblico, Siena, 127
Rucellai, Florence, 134
Sargon, Khorsabad, 17–18
Schonbrun, Vienna, 153
Spinelli, Venice, 138
Strozzi, Florence, 135, (87)
Tiryns, 24, 26, 27–28, (15), (16)
Tuileries, Paris, 147, 148, (96)
Vecchio, Florence, 127
Vendramini, Venice, 138
Versailles, 149, 150, (95)
Whitehall, London, 161, (105)
Xerxes, Persepolis, 19, (9), (13)
Palermo, Capella Palatina, 87
Cathedral, 95, (55)
Martorana Chapel, 87
Palladian Bridge, Prior Park, Bath, 168
at Witton Park, Wilts, 168
Palladian motif, 144, 172
Palladio, Andrea, architect, 143, 144, 149, 161, 166, 168, 169, 170, (92)
Palmerston, Lord, 192
Pandolfini Palace, Florence, 135
Pansa, House of, Pompeii, 72–73, (47)
Pantheon, London, 172
Paris, 151, 163, 186, (89)
Rome, 59, 60–61, 68–69, (35), (38)
Parapet, 54, 116
Paris, Arc de Triomphe, 151, 183
Arc du Carrousel, 151
Chambre des Députés, 151
Château of Maisons, 148, (97)
Dome of the Invalides, 145, 149, 151
Eiffel Tower, 192
Exhibition (1889), 191, 192
Grand Palace, 183
Halle des Machines, 191
Hôtel de Ville, 148
Hôtel des Invalides, 145, 149, 151
Library of S. Geneviève, 183, 193
Louvre, Palace, 147, 148, 150, (98)
Luxembourg Palace, 148
Madeleine church, 151, 183
Musée Galliera, 183
Notre Dame, 110, 111, 112
Opera House, 183, (121)
Panthéon, 151, 163, 186, (89)
Petit Palais, 183
Sainte Chapelle, 108, (67)
S. Vincent de Paul, 151
Parish Churches, English, 123, 124
Parker, Barry, architect, 204
Parthenon, Athens, 35–38, 42, 88, 186, (21), (22), (23)
Pausanias, 33
Pavia, Certosa (Monastery), 126–127, 137
S. Michele, 91, 93, 94
Pavilion, Brighton, 176
Paxton (Sir) Joseph, 190
Pazzi Chapel, Florence, 133
Pedestal, 54
Pediment, 36
Pendentive, 84–85, 132, 151, (52)
Penshurst Place, Kent, 160
Pentagonal bastion, invention of, 140
Pepere, architect, 151
Pepys, Samuel, 161
Pericles, 30, 34
Périgueux, S. Front, 97
Periods of English Medieval architecture, 114–115
Peripteral, 39
Peristyle, 47, 72
Perpendicular style, 115, 122, 123, 124
Perrault, Claude, architect, 147, 150, (98)
Perret, A. G., architect, 206
Perruzzi, architect, 134, 139–142, 143, 144
Persepolis, Hall of the Hundred Columns, 19
Hall of Xerxes, 19, (9), (13)
Perugia, City gates, 50
Etruscan walls, 49
Porta Marzia, 53, (28)
Tomb of the Volumni, 52, (33)
Peterborough Cathedral, 103, 104
Petit Palais, Paris, 183
Petit Trianon, Versailles, 150, (95)
Petrie, F., 8, 13
Phaestos, Crete, Palace at, 27
Pheidias, 38
Philadelphia, Bank of Pennsylvania, 186
Mint, 186
Saving Fund Society Building, 209, (130)
Piacenza Cathedral, 91
Pierpont Morgan Library, New York, 187
Pilaster, 62
Pilaster Strips, 93
Pinnacle, 111, 163
Pisa, Baptistery, 94
Campanile (Leaning Tower), 94, (57)
Cathedral, 92, 94, (57)
Pisani Palace, Venice, 128
Pitti Palace, Florence, 148
Place Stanislaus, Nancy, 150
Plate tracery, 110
Pliny, 65
Podium, 53, 62
Pointed arch, 101, 104, 106, 107, 109, 118
Poitiers Cathedral, 110, 111
Pompeian decoration, 73–74
Pompeii, 52, 71–74
Excavations, 145, 170, 171
House of Pansa, 72–73, (47)
House of the Surgeon, 72, (46)
Pope, J. Russell, architect, 202
Porches, 112, 119, 123, 127
Porta della Carta, Ducal Palace, Venice, 137
Porta, Giacomo della, architect, 142
Porta Marzia, Perugia, 53, (28)
Portcullis ornament, 115, 124, (70)
Port Sunlight, 195
Poseidon, Temple of, Paestum, 32, 34, 38, (20)
Power, Cyril E., 114
Poyet, P. architect, 151
Pozzolana, 55
Prandtauer, J., architect, 154

Prior, F. S., 114
Prior Park, Bath, 168
Pritchard, T. F., 189
Propylaea, Athens, 42, 184
Pugin, A. W. L., architect, 180
Pulpit, 78, 82
Purkersdorf Convalescent Home, 206
Pyramids of Egypt, 2, 3, 13
  Cheops (Great Pyramid), 4–6, (2), (5)
  Chephren, 4, (2)
  Mêdûm, 4
  Mykerinos, 4, (2)
  Sakkarah, Step Pyramid, 4, 8

QUADRIPARTITE vault, 100
"Queen Anne" style, 197
Queen's House, Greenwich, 161

RADCLIFFE Observatory, Oxford, 172, (118)
Rameses, Egyptian architect, 10
Rameses, Colossi of, Great Temple at Abou Simbel, 13, (4)
Ramesseum, 12, 14, (11)
Raphael, architect, 135, 136, 142
Rathhaus, Lemgo, 152
Ravenna, Baptistery of S. Giovanni, 86
  Cathedral (demolished), 82
  S. Apollinare in Classe, 82, 86
  S. Apollinare Nuovo, 82, 86
  S. Vitale, 83, 86, 87, (51), (53)
Record Office, Edinburgh, 171
Red House, Bexley Heath, 197
Refinements, Optical, of Greek architecture, 36–37
Reform Club, London, 178
Regency period, 156, 175, 177
Reinforced concrete, 194–195, 206, 210
Renaissance Arcade, 133, 139
  Orders of Architecture, 62, 133, 134–135, 139, 140, 141, 143
  Sub-periods, English, 156
Renaissance, English, 156–176
  French, 146–151
  German, 151–155
  Italian, 129–146
Revett, Nicholas, architect, 170
Rheims Cathedral, 111
Ribbed vault, 59, 97, 99–101, 103–104, 106–108, 118, 132, (59), (66)
Riccardi Palace, Florence, 135
Richardson, H. H., architect, 187, 193
Richmond, Virginia, Capitol, 186
Ripley, Thomas, architect, 168
Rochester Cathedral, 119
Rococo, Definition, 150
Rohe, Mies van der, architect, 209
Roman architecture, 53–55, 59–60, 74
  Amphitheatres, 65–66, (37)
  Attic, 54
  Basilicas, 60, 69–71, (44)
  Buildings despoiled, 64, 139
  buttresses, 60, 61
  Circuses, 66–67
  concrete, 56–59, (34)
  construction, 54–61, 106, 194, (34)
  domes, 60–61, 68–69, (35)
  dwellings, 71–74, (46), (47)
  Early mortar, 56, 57
  Forums, 60, 65, 68
Roman mural paintings, 73–74
  Orders of architecture, 54, 61–62, 65, (39)
  pedestal, 54
  pilaster, 26, 62
  podium, 53, 54, 62
  roof-truss, 60, 70–71
  tombs, 52
  Town planning, 84
  Triumphal arches, 67–68, (41)
  vaulting, 50, 57, 59–61, 71, 106
  wall-construction, 55–59, (34)
Romanesque, 90–105
  English (Saxon and Norman), 101–105
  French, 97–101
  Italian, 90–97
    Basilican, 91
    Lombard, 91–94
    Tuscan, 94–95
    S. Italian, 95
Romanesque architecture, defined, 90–91
  campanile, 82, 93, 94, (57)
  character, 90, 91–93, 96
  columns and piers, 94, 98, 103, 104, 106
  cupolas, 93–94
  latin-cross plan, 92
  Lion Porch, 93, (58)
  Rib-vaulting, 97, 99–101, 106, (59), (66)
  Vault development, 90, 91–93, 94, 96–97, 98–99, 106
  wall-arcades, 93, 94–95, (57)
Romanesque Revival, 187, 193
Rome, Arch of Constantine, 68, (41)
  Septimius Severus, 68
  Titus, 67
  Augustus, Mausoleum of, 51
  Basilica of Constantine, 59, 60, 71
  Julia, 65, 70
  Trajan, 69–71, (44)
  Basilican churches, 75–83
  Baths (Thermae), 60, 69, (42)
  Agrippa, 69
  Caracalla, 69
  Diocletian, 69, (39), (42)
  Nero, 69
  Trajan, 64, 69, 74
  Vespasian, 69
  Cancelleria Palace, 139
  Castle of S. Angelo, 51
  Castor and Pollux, Temple of, 63
  Catacombs, 52
  Circuses, 66–67
  Maximus, 66–67
  Colosseum, 64, 66, 134, (37)
  Constantine, Arch of, 68, (41)
  Basilica, 59, 60, 71
  Early vaults in, 50
  Etruscan institutions inherited, 49
  Farnese Palace, 139, (88)
  Farnesina Palace, 139
  Fortuna Virilis, temple of, 62–63, 65, (40)
  Forum Romanum, 65
  of Trajan, 60, 68
  Golden House of Nero, 64
  Hadrian, Mausoleum of, 51
  House of Livia, 71
  Marcus Aurelius, statue of, 65
  Mars Ultor, temple of, 63
  Mater Matuta, temple of, 62–63, 65, (40)
  Mausoleum of Augustus, 51

Rome, Mausoleum of Hadrian, 51
Nero's Golden House, 64
Palaces, Cancelleria, 139
Farnese, 139, (88)
Farnesina, 139
Massimi, 140
Pantheon, 59, 60–61, 68–69, (35), (38)
S. Angelo, Castle of, 51
S. Clemente, 77, 78, 81, (49), (50)
S. John Lateran, 9, 68, 77, 82
S. Lorenzo in Damaso, 139
S. Lorenzo outside the Walls, 139
S.M. degli Angeli, 69
S.M. del Popolo, 65
S.M. in Cosmedin, 91
S.M. Maggiore, 76, 77
S. Paul's outside the Walls, 77, 78, 80, (48)
S. Peter's, 4, 64, 68, 78, 89, 133, 136, 139, 141–143, 145, 151, 162, 164, (90)
S. Peter (old basilican church), 78, 80, (45)
Septimius Severus, arch of, 68
Temple of Castor and Pollux, 63
Fortuna Virilis (Mater Matuta), 62–63, 65, (40)
Mars Ultor, 63
Theatre of Marcellus, 64
Thermae (see Baths)
Titus, arch of, 67
Villa of Pope, Julius II, 143
Roof, open timber, 115, 123, (80)
Roof truss, 60, 70–71, 77, (45)
Root, J. W., architect, 193
Rose window, 93, 113, 119
Rouen Cathedral, 113
Hotel de Ville, 113
S. Maclou, 113
Royal Crescent, Bath, 168
R.I.B.A. Headquarters, London, 200, (125)
Rucellai Palace, Florence, 134
Ruhmeshalle, Munich, 184
Ruskin, John, Writings of, 77, 120, 128, 180, 196–197

S. Ambrogio, Milan, 91, 92, 100
S. Angelo, Castle of, 51
S. Apollinare in Classe, 82, 86
S. Apollinare Nuovo, 82, 86
S. Bride, Fleet Street, London, 165
S. Chapelle, Paris, 108, (67)
S. Clemente, Rome, 77, 78, 81, (49), (50)
S. Dunstan-in-the-West, London, 179
S. Etienne (Abbaye-aux-Hommes), Caen, 99, 100, (59)
S. Florian, Monastery of, 154
S. Francesco, Assisi, 125
S. Front, Périgueux, 97
S. Geneviève, Library of, Paris, 183, 193
S. George, Bloomsbury, London, 165
S. George's Chapel, Windsor, 122
S. George's Hall, Liverpool, 178
S. Giovanni, Baptistery of, Ravenna, 86
S. Jacques, Dieppe, 113
S. James, Piccadilly, London, 165
S. John Lateran, Rome, 9, 68, 77, 82
S. John Nepomuk, Munich, 154
S. Lawrence, Bradford-on-Avon, 101, (64)
S. Lorenzo in Damaso, Rome, 139
S. Lorenzo, Florence, 133
S. Lorenzo-outside-the-Walls, 139
S. Maclou, Rouen, 113
S. Maria degli Angeli, Rome, 69
S. Maria dei Miracoli, Venice, 138, (86)
S. Maria dei Fiore (see Florence Cathedral)
S. Maria in Cosmedin, Rome, 91
S. Maria Maggiore, Bergamo, 127
S. Maria Maggiore, Rome, 76, 77
S. Maria Novella, Florence, 134
S. Maria presso S. Satiro, Milan, 137
S. Mark, Venice, 88–89, 97, 138, (54), (56)
S. Martin-in-the-Fields, London, 165
S. Mary-le-Bow, London, 164, (112)
S. Mary-le-Strand, London, 165
S. Mary, Oxford, 161
S. Mary, Stourbridge, 104
S. Mary Woolnoth, London, 165
S. Michele, Pavia, 91, 93
S. Miniato, Florence, 92, 94, (60)
S. Ouen, Rouen, 113
S. Pancras Church, London, 178, (119)
S. Pancras Station, London, 181, 191
S. Paul, Covent Garden, London, 161
S. Paul's, London, 89, 133, 135, 151, 162–164, (108), (111)
S. Paul outside the Walls, Rome, 77, 78, 80, (48)
S. Paulin, Trèves, 154–155, (101)
S. Peter, Rome, 4, 64, 68, 78, 89, 133, 136, 139, 141–143, 151, 162, 164, (90)
Old basilican church, 78, 80, (45)
S. Petronio, Bologna, 125
S. Sophia, Constantinople, 85–86, 88–89, (43)
S. Spirito, Florence, 133
S. Stephen, Norwich, (80)
S. Trophîme, Arles, 98
S. Vincent de Paul, Paris, 151
S. Vitale, Ravenna, 83, 86–87, (51), (53)
S. Vulfran, Abbeville, 113
S. Zaccharia, Venice, 138
S. Zeno, Verona, 91, 93, (58)
Sakkarah, Step Pyramid, 4, 8
Salisbury Cathedral, 111, 116, 119–120, 122, 173, (71), (73)
compared with Amiens Cathedral, 119–120, (68), (74)
Salt, Sir Titus, 195
"Saltaire," Bradford, 195
Salzburg, University church, 153
Sangallo, Antonio da, the Younger, architect, 139, (88)
Sangallo, Giuliano da, 142, 143
Sanmichele, architect, 140, 141
Sansovino, architect, 141, 143, (85)
Sargon, Palace of, Khorsabad, 17, (10)
Saxon architecture, 101–102
Scamozzi, architect, (92)
Schinkel, architect, 184
Schonbrun Palace, Vienna, 154
School of Art, Glasgow, 198–199, (126)
Scopas, Greek sculptor, 41
Scott, Miss E., and Chesterton and Shepherd, architects, 206
Scott, G. Gilbert, architect, 202
Scott, Sir Gilbert, 180–181, 191–192, 202
Scottish Rite, Temple of, Washington, 202
Seaweed ornament, 124
Segesta, Sicily, temple at, 39
Selinus, Sicily, temples at, 38
Seneferu, pyramid of, Dahsur, 4
Mêdûm, 4

Septimius Severus, arch of, Rome, 68
Serlio, architect, 147
Seville Cathedral, 125
Sexpartite Vaulting, defined, 100, (59)
Shakespeare Theatre, Stratford-on-Avon, 206
Shaw, John, architect, 179
Shaw, Norman, architect, 197
Sheldonian Theatre, Oxford, 165
Siena, Casa Pollini, 140
  Cathedral, 125
  Fortifications at, 140
  Palazzo Pubblico, 127
Sitte, Camillo, 204
Skyscraper, 190, 193, 194, 202–203, (130)
Smirke, Sir Robert, architect, 178
Soane, Sir John, architect, 175, 178
Soane Museum, London, 159, 175
Somerset House, London, 169, (104)
Soufflot, architect, 151, (89)
Southwell Cathedral, 122
Spinelli Palace, Venice, 138
Spires, 110, 120, 155, 164
Stained glass, 109–110, 111, 121, 126
Stamford, Burghley House, 159
Steckhoven, A. von, garden architect, 154
Steel, 188, 189, 193, 194, 201, 206, 210
Steeples (see Spires)
Stele, 46
Stephenson, Robert, engineer, 189
Stockholm Town Hall, 202
Stokesay Castle, Shropshire, 123, (78)
Stone, Nicholas, architect, 162
Stratford-on-Avon, Shakespeare Theatre, 206
Strawberry Hill, 174
Strozzi Palace, Florence, 135, (87)
Stuart, James, architect, 170
Stuart period, 156
Stucco, 171, 175
Styles of English Gothic Architecture, 114–116
  English Renaissance architecture, 156
Sullivan, Louis, architect, 193, 207
Sun House, Hampstead, London, 210, (133)
Superga, Turin, 145
Suspension Bridge, Clifton, Bristol, 189
  Conway, 189
  Menai, 189
Sydenham, Crystal Palace, 190, (124)
Sydney Harbour Bridge, 191
Syon House, Isleworth, 171
Syracuse, Temple of Apollo, 34

Tablinum, 52, 73
Tait, Thomas, architect, 210
Talenti, architect, 129
Taut, Bruno, architect, 209
Taylor, Sir R., architect, 168, 171
Taylor Institution, Oxford, 178
Team Valley Trading Estate, Newcastle-on-Tyne, 211
Tecton, architects, 210
Telford, Thomas, engineer, 189
Temple Bar, London, 162
Temple Church, London, 119
Temple of the Scottish Rite, Washington, 202
Temple Abou Simbel, 13, (4)
  Abydos, 9
  Agrigentum, Sicily, 38
  Ammon, Karnak, 9, 10, 11, 14, 19, (7), (8)
  Luxor, 9, 14
Temple, Apollo Epicurius, Bassae, 39, 42, 43
  Apollo, Syracuse, 34
  Artemis, Ephesus, Archaic temple, 39–40, (18), (24)
    Later, 39, 40–41
  Babylon, Tower of the Seven Planets, 17
  Bassae, 39, 42, 43
  Birs Nimroud, 7
  Castor and Pollux, Rome, 63
  Denderah, 9, 13
  Edfou, 13, 14, (3)
  Ephesus, Archaic, 39–40, (18), (24)
    Later, 39, 40–41
  Erechtheum, Athens, 43, 178, (23), (25), (26)
  Etruscan, 49, 53, (30)
  Fortuna Virilis (Mater Matuta), Rome, 62–63, 65, (40)
  Heliopolis, 9
  Heraeum, Olympia, 30, 33–34
  Karnak, 9, 10, 11, 14, 19, (7), (8)
  Luxor, 9, 14
  Maison Carrée, Nîmes, 65, 186, (36)
  Mars Ultor, Rome, 63
  Memphis, 9
  Niké Apteros, Athens, 42
  Paestum, 32, 34, 38, (20)
  Pantheon, Rome, 59, 60–61, 68–69, (35), (38)
  Parthenon, Athens, 35–38, 42, 88, 186, (21), (22), (23)
  Philae, 13
  Poseidon, Paestum, 32, 34, 38, (20)
  Ramesseum Thebes, 12, 14, (11)
  Selinus, 38
  Syracuse, 34
  Theseum, Athens, 38
  Zeus, at Olympia, 38–39
  Zeus Olympius, Athens, 45, 68
Tenements, 195
Terra-cotta, Italian Renaissance, 137, 140
  Greek and Etruscan, 53
  Nineteenth century, 182
Thackeray, quoted, 190
Theatre, of Dionysus, Athens, 45
  Epidaurus, 45–46, (31)
  Greek and Roman compared, 45–46
  Marcellus, Rome, 64
  Movable scenery, 144
  Palladio's improvements, 144
  Pompey, Rome, 139
Thebes, Ramesseum, 12, 14, (11)
  Tombs of the Kings, (13)
Thermae, Agrippa, 69
  Caracalla, 69
  Diocletian, 69, (39), (42)
  Nero, 69
  Trajan, 64, 69, 74
  Vespasian, 69
Theseum, Athens, 38
Tholos tombs, Aegean, 28–29, (17)
  Etruscan, 51
Thorpe, John, architect, 159
Timber roofs, open, 115, 123, (80)
  triangulation principle, 32, 60, 70
Tiryns, palace at, 24, 26, 27–28, (15), (16)
  Megaron, 25, (15)
Titus, arch of, Rome, 67
Tomb of the Stuccoes, Cerveteri, (29)
Tomb of Agamemnon (see Treasury of Atreus), Mycenae

Tomb of Augustus, Rome, 51
Beni Hasan, 7, 8, (6)
Cerveteri (Caere), 50, 52, (29)
Hadrian, Rome, 51
Halicarnassos (Mausoleum), 46, 202
Henry VII, Westminster, 157, 179–180
Volumni, Perugia, 52–53, (33)
Torrigiano, sculptor, 157
Toulouse Cathedral, 113
Tours Cathedral, 110, 113
Tower of the Seven Planets, Babylon, 17
Tower of the Winds, Athens, 173, 178
Town Hall, Norwich, 200
Stockholm, 202
Town Planning, 47, 84, 195–196, 203–204, 211
Trabeated architecture defined, 53
Tracery, 109, 110, 113, 115, 119, 121, 124
Trading Estate, Team Valley, Newcastle-on-Tyne, 211
Trajan, Arch of, Rome, 67
Basilica of, Rome, 69–71, (44)
Forum, Rome, 60, 68
Thermae, Rome, 64, 69, 74
Transepts, development of, 80, 81, 111, 119, 120, 121
Transverse rib, definition, 100
Travellers Club, London, 178
Treasury of Atreus, Mycenae, 29, (17)
Trèves, S. Paulin, 154–155, (101)
Triapsal church, 80
Triforium, 98, 100
Trinity Church, New York, 187
Trinity College Library, Cambridge, 165, 179
Triumphal Arch, in basilican churches, 80
Triumphal Arches, Roman, 60, 67–68
Troyes Chathedral, 110, 113
House at, 113
Trussed (triangulated) roofs, 32, 60, 70
Tubular Bridge, Conway, 189
Britannia, Menai Strait, 189
Tudor style, 114–116, 156
Tudor rose, 115, 124, (70)
Tuileries, Palace of, Paris, 147, 148, (96)
Tumuli, Etruscan, 50–51
Tura, Egyptian quarries at, 5
Turbine factory, Berlin, 206
Turin, Superga, 145
Tuscan Order, 61

Underground Railway Offices, London, 201
Unfoliated capital (Early English), 115, 124, (81)
University Church, Salzburg, 153
University College, London, 178
University of Virginia, 186
Unwin, Sir Raymond, architect, 204
Upjohn, R. M., architect, 187
Ur of the Chaldees, remains at, 17

Vanbrugh, Sir John, architect, 165, 166
Vardy, John, architect, 168
Vatican, 64
Vaulting, Aegean, 28
Assyrian, 18
Byzantine, 84–85, (52)
Egyptian, 8
Gothic, 97, 106–108, 110, 112, 118, 119, 120, 121
Vaulting, Norman Romanesque (France), 99–101, (59)
(England), 103–104
Romanesque, 90, 91–93, 94, 96–97, 98–99, 106
ribbed, 97, 99–101, 106, (59), (66)
Veii, Etruscan City, 49
Vendramini, Palace, Venice, 138
Venice, Cà d'Oro, 128, (79)
Doge's Palace, 127–128
Old Library of S. Mark, 141, (85)
Palace, Foscari, 128
Pisani, 128
Spinelli, 138
Vendramini, 138
S. M. dei Miracoli, 138, (86)
S. M. della Salute, 145, (93)
S. Marks, 88–89, 97, 138, (54), (56)
S. Zaccaria, 138
Verona, Casa Pollini, 140
Palace Pompeii, 140
S. Zeno, 91, 93, (58)
Versailles, 149, 150
Petit Trianon, 150, (95)
Vespasian, Baths of, 69
Vesuvius, eruption of, 71
Vicenza, "Basilica Palladiana," 144
Villa Capra, 144, 166, (92)
"Victoria," J. S., Buckingham's ideal town, 195
Vienna, Belvedere Palace, 153
Hofburg Palace, 153
Houses of Parliament, 184
Karlskirche, 153, (100)
Schonbrun Palace, 154
Vignola, G. B., architect, 142, 143–144, 149, (91)
Vignon, B., architect, 151
Villa Borghese, Rome, Gateway, 183
Capra, Vicenza, 144, 166, (92)
at Chiswick, 166–167, (110)
Lante, Viterbo, 143
of Pope Julius II, Rome, 143
Vine Leaf ornament, 124
Viollet-le-Duc, 111
Virginia, U.S.A., Capitol, 186
Volterra, Etruscan works at, 49, 50
Voussoirs, 100
Voysey, C. F. A., architect, 198
Vulca of Veii, 53

Wall arcades, Romanesque, 93, 94–95, (57)
Wall-rib, 100
Wall construction, Roman, 56–59, (34)
Walpole, Horace, 174
Ware, Isaac, architect, 168
Washington, U.S., Capitol at, 186
Lincoln Memorial, 202, (129)
Scottish Rite Temple, 202
White House, 186
Webb, John, architect, 162–166
Webb, Philip, architect, 197
Wells Cathedral, 122
Welwyn Garden City, 195, 204
Westminster Abbey, 101, 120
Henry VII Chapel, 122, (77)
Tomb of Henry VII, 157, 179–180
Westminster Cathedral, 181
Westminster Hall, 123
White House, Washington, U.S., 186

Whitehall, Banqueting Hall, 161, (105)
Whitestone Bridge, New York, 211, (131)
Wilkins, W., architect, 178, 179
William of Sens, 118
Winchester Cathedral, 112, 119
Windows, Gothic, 108, 109, 110, 115
  Romanesque, 96
Windsor Castle, 176
  S. George's Chapel, 122
Witton Park, Wiltshire, 168
Wolfenbüttel, Marienkirche, 152
Wollaton Hall, Notts, 158, (106)
Wood, John and Son (John), architects, 168
Wood, Robert, architect, 170
Woolworth Building, New York, 202
Worcester Cathedral, Chapter House, 122
Wornum, G. Grey, architect, (125)
Worth Church, Sussex, window, (65)
"Wren" period, Definition, 156
Wren, Sir Christopher, architect, 156, 162–166, 174, (108), (111)
Wright, F. Lloyd, architect, 207
Wrought iron, 189
Wyatt, James, architect, 172–174, 175, 179, (115), (118)
Wyatville, Sir J., architect, 176
Wynne, Captain, architect, 165
Wythenshawe, Manchester, 204

Xerxes, Great Hall of, Persepolis, 19, (9), (13)

York Cathedral, 112, 121, 122
York, Civic design by John Carr, 168
York Water Gate, London, 161–162

Zoser, pyramid of, Sakkarah, 4, 8
Ziggurat, 17
Zig-zag Norman ornament, 104, 118, 124

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